ASIAN DEVELOPMENT BANK

PCR:IND 18182

PROJECT COMPLETION REPORT

ON THE

COAL PORTS PROJECT
(Loan 1181-IND)

IN

INDIA

September 2003

CURRENCY EQUIVALENTS

Currency Unit – Indian rupee/s (Re/Rs)

		At Appraisal	At Project Completion
		30 June 1992	18 April 2002
Re1.00	=	$0.035	$0.02043
$1.00	=	Rs28.28	Rs48.95

ABBREVIATIONS

ADB	–	Asian Development Bank
BOBR	–	bottom opening bottom receiving
BOT	–	build-operate-transfer
CHPT	–	Chennai Port Trust
DA	–	development advisor
EA	–	Executing Agency
EIRR	–	economic internal rate of return
EPL	–	Ennore Port Limited
FIDIC	–	Fédération International des Ingenieurs-conseils
FIRR	–	financial internal rate of return
GMB	–	Gujarat Maritime Board
HLSC	–	high level steering committee
ICB	–	international competitive bidding
IDC	–	interest during construction
INRM	–	India Resident Mission
LA	–	Loan Agreement
MCHP	–	mechanized coal handling plant
MCL	–	Mahanadi Coalfields Limited
MOS	–	Ministry of Shipping
MOST	–	Ministry of Surface Transport
MOR	–	Ministry of Railways
MOU	–	memorandum of understanding
NCTPS	–	North Chennai Thermal Power Station
NTPC	–	National Thermal Power Corporation
PIC	–	project implementation cell
PIO	–	project implementation office
POL	–	petroleum, oil, and lubricants
PPT	–	Paradip Port Trust
ROW	–	right of way
RRS	–	rail receiving station
SEB	–	State Electricity Board
SPM	–	suspended particulate matter
TA	–	technical assistance
TAMP	–	Tariff Authority for Major Ports
TIDCO	–	Tamil Nadu Industrial Development Corporation
TNEB	–	Tamil Nadu Electricity Board
TTPS	–	Tuticorin Thermal Power Station
WACC	–	weighted average cost of capital

WEIGHTS AND MEASURES

m^3	(cubic meter)	–	unit of volume
dwt	(deadweight ton)	–	unit of ship capacity
ha	(hectare)	–	unit of land area
kg	(kilogram)	–	unit of weight
km	(kilometer)	–	1,000 meters
kW	(kilowatt)	–	1,000 watts
mm	(millimeter)	–	0.001 meters
m	(meter)	–	unit of distance
MMCM	(million cubic meters)	–	unit of volume
MT	(million tons)	–	1,000,000 tons
mtkm	(million ton kilometer)	–	1,000,000 tkm
MTPA	(million tons per annum)	–	unit of weight per annum
MW	(megawatt)	–	1,000 kilowatts
t	(metric ton)	–	1,000 kilograms
teu	(twenty-foot equivalent unit)	–	unit of container cargo
t-km	(ton-kilometer)	–	unit of weight transported by rail
tph	(ton per hour)	–	unit of weight loading per hour

NOTES

(i) The fiscal year (FY) of the Government, Paradip Port Trust, and Chennai Port Trust ends on 31 March. FY before a calendar year denotes the year in which the fiscal year ends.

(ii) In this report, “$” refers to US dollars.

CONTENTS

SUPPLEMENTARY APPENDIXES (available upon request)

BASIC DATA

A. Loan Identification

1.	Country	India
2.	Loan Number	1181-IND
3.	Loan Title	Coal Ports Project
4.	Borrower	India
5.	Executing Agency	Chennai Port Trust (CHPT) Paradip Port Trust (PPT)
6.	Amount of Loan (net of cancellation)	$233.491 million
	First Cancellation	$35.100 million 13 November 2000
	Second Cancellation	$8.000 million 26 June 2001
	Third Cancellation	$8.409 million 18 April 2002
7.	Project Completion Report Number	PCR:IND 757

B. Loan Data

1.	Appraisal	
	- Date Started	07 May 1991
	- Date Completed	22 May 1991
2.	Loan Negotiations	
	- Date Started	29 June 1992
	- Date Completed	03 July 1992
3.	Date of Board Approval	27 October 1992
4.	Date of Loan Agreement	12 February 1993
5.	Date of Loan Effectiveness	
	- In Loan Agreement	13 May 1993
	- Actual	07 July 1993
	- Number of Extensions	1
6.	Closing Date	
	- In Loan Agreement	30 June 1998
	- Actual	18 April 2002
	- Number of Extensions	3
7.	Terms of Loan	
	- Interest Rate	6-month variable ordinary capital resources (OCR) rate
	- Maturity (number of years)	25 years
	- Grace Period (number of years)	5 years
8.	Terms of Relending	
	- Interest Rate	Not less than OCR rate
	- Second-Step Borrower	Paradip Port Trust Chennai Port Trust

9. Disbursements

a. Dates

Initial Disbursement	Final Disbursement	Time Interval
15 Aug 1993	31 Jan 2002	7 years, 7 months
Effective Date	**Original Closing Date**	**Time Interval**
07 Jul 1993	30 Jun 1998	5 years

b. Amount ($ million)

Category		Original Allocation	Last Revised Allocation	Net Amount Disbursed	Undis-bursed Balance
A.	**Paradip Port**				
	Construction of Two Berths	11.50	11.21	11.21	0.00
	Dredging	2.15	3.42	3.42	0.00
	Environmental Protection and Soil Preparation at Stockyard	1.90	0.35	0.35	0.00
	Onshore Civil Works	12.50	6.19	6.19	
	Coal Handling Equipment	59.80	73.88	73.88	0.00
	Floating Craft	4.30	2.57	2.57	0.00
	Consulting Services	4.26	13.50	13.50	0.00
	Unallocated	22.94	0.00	0.00	0.00
	Interest and Commitment Charge During Construction[a]	15.50	9.66	9.66	0.00
	Subtotal (A)	**134.85**	**120.78**	**120.78**	**0.00**
B.	**Ennore Port**				
	Construction of Two Berths	10.90	9.12	9.12	0.00
	Breakwater Construction	49.00	54.98	54.98	0.00
	Dredging	21.80	14.95	14.95	0.00
	Coastal/Environmental Protection	3.20	0.00	0.00	0.00
	Navigational Aids	0.50	0.32	0.32	0.00
	Floating Craft	17.50	13.11	13.11	0.00
	Consulting Service	5.10	8.29	8.29	0.00
	Unallocated	26.00	0.00	0.00	0.00
	Interest and Commitment Charge During Construction[a]	16.15	11.94	11.94	0.00
	Subtotal (B)	**150.15**	**112.71**	**112.71**	**0.00**
Total (A + B)		**285.00**	**233.49**	**233.49**	**0.00**

[a] Interest and commitment charges during construction capitalized from the loan. In addition, the Borrower paid an amount of $25.5 million toward interest and commitment charges, until the loan closing date.

10. Local Costs (financed) none

C. Project Data

1. Project Cost ($ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	285.00	280.97
Local Currency Cost	158.00	161.52
Total	**443.00**	**442.47**

2. Financing Plan ($ million)

	Appraisal Estimate			Actual		
Item	**Foreign**	**Local**	**Total**	**Foreign**	**Local**	**Total**
Expansion of Paradip Port						
PPT	0.00	65.05	65.05	4.80	54.14	58.94
ADB	119.35	0.00	119.35	111.12	0.00	111.12
IDC Costs						
PPT	0.00	13.25	13.25	7.26	14.41	21.67
ADB	15.50	0.00	15.50	9.66	0.00	9.66
Development of Ennore Port						
CHPT	0.00	63.3	66.30	16.86	68.01	84.86
ADB	134.00	0.00	134.00	100.76	0.00	100.76
IDC Costs						
CHPT	0.00	13.40	13.40	18.56	24.96	43.52
ADB	16.15	0.00	16.15	11.94	0.00	11.94
Total	**285.00**	**158.00**	**443.00**	**280.97**	**161.52**	**442.47**

ADB = Asian Development Bank, CHPT = Chennai Port Trust, IDC = interest during construction, and PPT = Paradip Port Trust.

3. Cost Breakdown by Project Components ($ million)

	Appraisal Estimate			Actual		
Item	**Foreign**	**Local**	**Total**	**Foreign**	**Local**	**Total**
A.Expansion of Paradip Port						
Base Cost						
Construction of Berths (2)	11.50	6.17	17.67	13.96	7.52	21.48
Dredging	2.15	0.45	2.6	6.29	1.57	7.86
Environmental Protection/Soil Preparation at Stockyard	1.90	1.43	3.33	0.38	0.25	0.63
Civil Works (amenities and utilities)	12.50	10.56	23.06	10.16	8.31	18.47
Coal Handling Equipment	59.80	25.70	85.50	67.24	28.82	96.06
Floating Craft	4.30	1.80	6.10	2.34	1.00	3.34
Engineering and Supervision	4.26	1.78	6.04	15.55	6.66	22.21
Contingencies						
Physical Contingency	12.80	6.25	19.05	0.00	0.00	0.00
Price Contingency	10.14	10.91	21.05	0.00	0.00	0.00
Interest During Construction[a]	15.50	13.15	28.65	16.92	14.41	31.33
Subtotal (A)	**134.85**	**78.20**	**213.05**	**132.84**	**68.55**	**201.39**

[a] Interest and commitment charges for project-related borrowing paid during construction by the Executing Agency.

Item	Appraisal Estimate			Actual		
	Foreign	Local	Total	Foreign	Local	Total
B.Development of Ennore Port						
Base Cost						
Breakwater Construction	49.00	21.00	70.00	65.84	28.22	94.06
Construction of Berths (2)	10.90	5.90	16.80	10.12	5.45	15.57
Dredging	21.80	5.50	27.30	18.03	4.51	22.53
Coastal/Environmental Protection	3.20	1.30	4.50	0.00	0.00	0.00
Miscellaneous Civil Works	0.00	5.10	5.10	0.00	15.75	15.75
Floating Craft	17.50	6.80	24.30	11.50	4.93	16.42
Navigational Aids	0.50	0.15	0.65	0.38	0.10	0.48
Land Acquisition	0.00	0.70	0.70	0.00	4.02	4.02
Engineering and Supervision	5.10	2.25	7.35	11.76	5.04	16.80
Contingencies						
Physical Contingency	14.30	6.30	20.61	0.00	0.00	0.00
Price Contingency	11.70	11.40	23.11	0.00	0.00	0.00
Interest During Construction[a]	16.15	13.40	29.55	30.50	24.96	55.46
Subtotal (B)	**150.15**	**79.80**	**229.95**	**148.13**	**92.97**	**241.08**
Total (A+B)	**285.00**	**158.00**	**443.00**	**280.97**	**161.52**	**442.47**

[a] Interest and commitment charges for project-related borrowing paid during construction by the Executing Agency.

3. Project Schedule

Item		Appraisal Estimate		Actual	
		Start	End	Start	End
Paradip Port					
Environmental Protection/Soil Preparation at Stackyard	D	Jan 1993	Jun 1993	Jan 1995	Jul 1995
	T	Jul 1993	Mar 1994	Aug 1995	Mar 1996
	C	Apr 1994	Mar 1995	Apr 1996	Jun 1998
Construction of Berths (2)	D	Jan 1993	Sep 1993	Feb 1995	Aug 1995
	T	Oct 1993	Jun 1994	Sep 1995	Dec 1996
	C	Jul 1994	Mar 1997	Jan 1997	Dec 1999
Dredging	D	Oct 1994	Mar 1995	Jan 1995	Jun 1995
	T	Apr 1995	Dec 1995	Jul 1995	Feb 1996
	C	Jan 1996	Dec 1996	Mar 1996	Oct 1996
Civil Works (Mechanical Handling)	D	Jan 1993	Mar 1994	Jan 1995	Jul 1995
	T	Apr 1994	Dec 1994	Mar 1995	Sep 1997
	C	Jan 1995	Jun 1997	Aug 1997	May 2002
Coal Handling System	D	Jul 1993	Mar 1994	Jul 1995	May 1996
	T	Jan 1994	Mar 1995	Mar 1996	Feb 1997
	C	Jul 1994	Jun 1997	Mar 1997	Nov 2001
Utilities, Amenities, and Buildings	D	Oct 1993	Jun 1994	Jan 1995	Jul 1995
	T	Jul 1994	Mar 1995	Aug 1996	Jul 1998
	C	Apr 1995	Mar 1997	Aug 1997	Mar 2002
Floating Craft	D	Jan 1994	Jun 1994	Jul 1995	Dec 1995
	T	Jul 1994	Mar 1995	Nov 1997	Jul 1999
	C	Apr 1995	Dec 1996	Nov 1998	Jul 2002

Item		Appraisal Estimate Start	Appraisal Estimate End	Actual Start	Actual End
Ennore Port					
Construction of Breakwaters (2)	D	Jan 1993	Jun 1993	Mar 1995	Jun 1996
	T	Jul 1993	Mar 1994	Dec 1995	Mar 1997
	C	Apr 1994	Dec 1997	Jun 1996	Jul 2002
Dredging	D	Oct 1993	Mar 1994	Dec 1995	Jul 1996
	T	Apr 1994	Dec 1994	Aug 1996	Mar 1997
	C	Jan 1995	Mar 1997	Feb 1999	Feb 2000
Construction of Berths (2)	D	Jan 1994	Sep 1994	Dec 1995	Jul 1996
	T	Oct 1994	Jun 1995	Aug 1996	Mar 1997
	C	Jul 1995	Dec 1997	Aug 1997	Feb 2000
On-Shore Civil Works	D	Jul 1993	Dec 1993	Mar 1995	Dec 1995
	T	Jan 1994	Sep 1994	Jan 1996	Jul 1999
	C	Oct 1994	Mar 1996	Apr 1996	Mar 2002
Navigational Aids and Floating Craft	D	Apr 1994	Sep 1994	Apr 1996	Feb 1999
	T	Oct 1994	Jun 1995	Jan 1998	Sep 1999
	C	Jul 1995	Dec 1997	Aug 1999	Jan 2001
Utilities	D	Oct 1994	Mar 1995	Sep 1994	Mar 1995
	T	Apr 1995	Dec 1995	Apr 1996	Jul 1999
	C	Jan 1996	Dec 1996	Oct 1996	Oct 2001

C = construction , D = design and prequalification, and T = tendering.
Apr = April, Aug = August, Dec = December, Feb = February, Jan = January, Jul = July, Jun = June, Mar = March, Nov = November, Oct = October, and Sep = September.

5. Project Performance Report Ratings[a]

Implementation Period					Ratings: Development Objectives	Ratings: Implementation Progress
(i)	From	30 Oct 1992	to	31 May 1998	AAA	AAA
(ii)	From	1 Jun 1998	to	31 Jan 2000	PS	U
(iii)	From	1 Feb 2000	to	31 Dec 2000	U	U
(iv)	From	1 Jan 2001	to	31 Dec 2001	U	PS

AAA = highly satisfactory, PS = partially satisfactory, U = unsatisfactory.
Dec = December, Feb = February, Jan = January, Jun = June, and Oct = October.

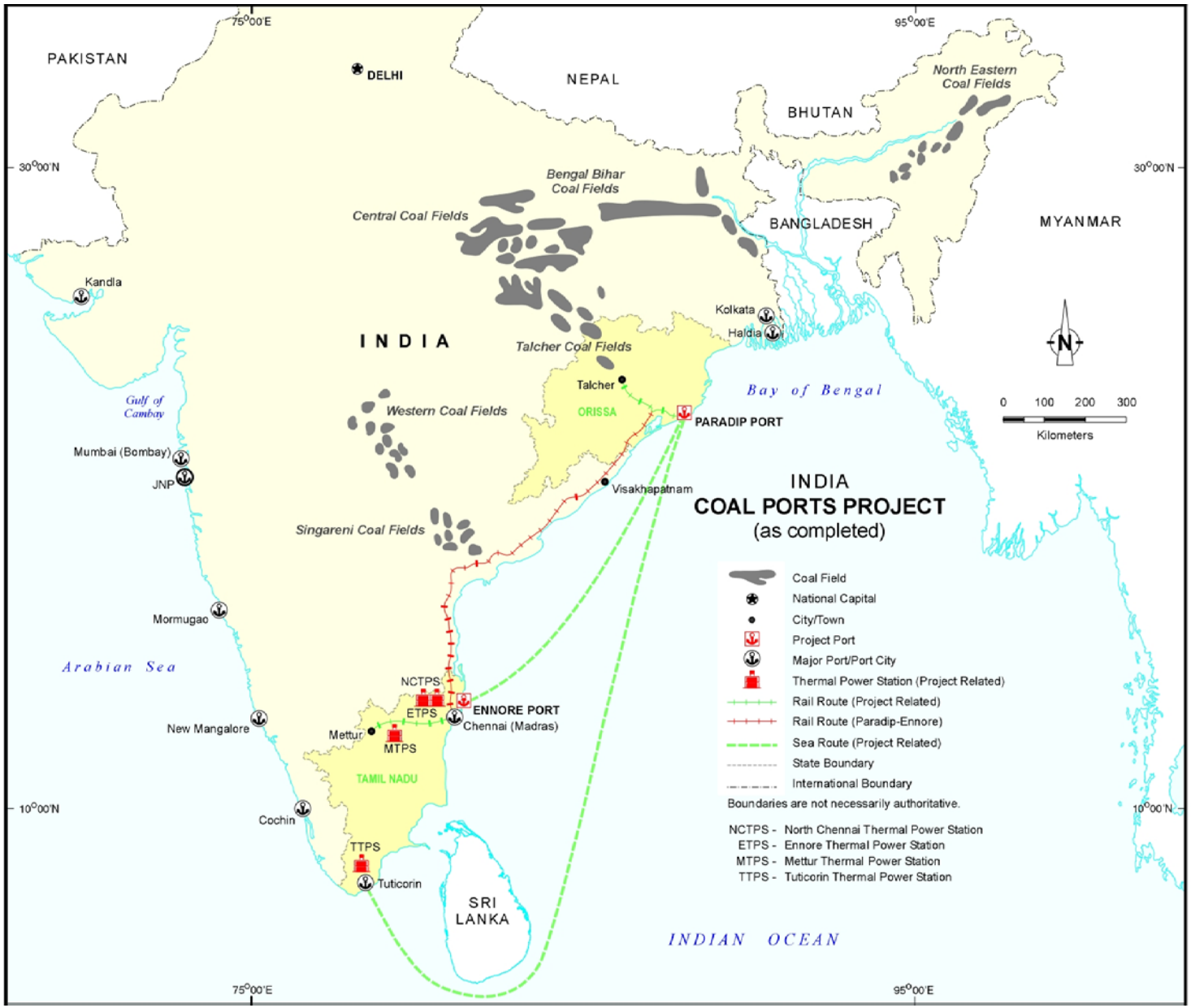
[a] The Project Performance Report ratings from 1992 to 1998 were based on Project Administration Committee (PAC) Notes, which have now been replaced by Project Performance Report (PPR) system based ratings that use different methodologies. The ratings from 1998 to 2001 were based on PPRs. Information on progress in achieving development objectives and project implementation are common to both PAC notes and PPRs. The reasons for the change in ratings from AAA to PS/U in 1998 were: (i) noncompletion of the Project before the original loan closing date and (ii) delays in the proposed 1,500 megawatt expansion through private sector participation of the North Chennai Thermal Power Station. The methodologies for project ratings in PAC notes and PPRs are different from those of Project Completion Report ratings.

D. Data on Asian Development Bank Missions

Name of Mission	Date	No. of Persons	No. of Person-Days	Specialization of Members
Reconnaissance	2–14 Feb 1987	1	13	a
Follow-up 1	20–23 Jul 1987	1	4	a
Follow-up 2	12–16 Feb 1988	1	5	a
Fact-Finding	19 Sep–9 Oct 1990	8	168	a,b,d,h
Follow-up Fact-Finding	12–27 Feb 1991	8	128	a,b,d,e,g,h
Appraisal	6–23 May 1991	7	119	a,b,c,d,g,h
Follow-up Appraisal	30 Mar–13 Apr 1992	7	105	a,b,c,d,e,g
Special Loan Administration 1	1–7 Feb 1993	1	7	a
Special Loan Administration 2	29 Sep–7 Oct 1993	1	9	a
Contract Administration 1	25 Nov–5 Dec 1993	1	11	e
Contract Administration 2	17–22 Apr 1994	1	6	e
Review 1	27 Nov–7 Dec 1994	2	22	a
Special Review	13–16 May 1995	4	4	a
Review 2	16–30 May 1995	2	30	a
Review 3	18–29 Nov 1995	3	33	a,d
Review 4	12–19 May 1996	1	8	a
Review 5	21–28 Sep 1996	3	24	a,i
Midterm Review	30 May–13 Jun 1997	2	30	a,d
Review 6	29 Oct–6 Nov 1998	2	16	d,i
Review 7	1–12 Feb 1999	3	36	a,g,i
Review 8	27 Jul–2 Aug 1999	1	7	a
Review 9 and Audit	14–19 Nov 1999 and 11–15 Jan 2000	4	33	a,e,f
Review 10	21–26 May 2000 and 17–19 Jul 2000	3	24	a,e,i
Review 11	27–30 Mar 2001	2	8	a,e
Review 12	3–7 Dec 2001	1	5	a
Project Completion Review Mission[a]	19–22 Mar 2003 and 27 Mar–2 Apr 2003	3	10	a,b,e,i

a = engineer, b = financial analyst, c = counsel, d = economist, e = procurement specialist/consultant, f = control officer, g = programs officer, h = environment specialist, and i = loan administration staff.
Apr = April, Aug =August, Dec = December, Feb = February, Jan = January, Jul =July, Jun = June, Mar = March, No. = number, Nov = November, Oct = October, and Sep = September.

[a] This report was prepared by Anil K. Motwani, Project Implementation Officer (Transport), India Resident Mission (INRM); Riti Kapoor, Assistant Project Analyst, INRM; and a staff consultant (Ports).


PAKISTAN
DELHI
NEPAL
BHUTAN
North Eastern Coal Fields
BANGLADESH
MYANMAR
Bengal Bihar Coal Fields
Central Coal Fields
Kandla
INDIA
Kolkata
Haldia
Talcher Coal Fields
Talcher
ORISSA
Bay of Bengal
PARADIP PORT
Gulf of Cambay
Western Coal Fields
Mumbai (Bombay)
JNP
Visakhapatnam
Singareni Coal Fields
Mormugao
Arabian Sea
NCTPS
ETPS
ENNORE PORT
Chennai (Madras)
New Mangalore
Mettur
MTPS
TAMIL NADU
Cochin
TTPS
Tuticorin
SRI LANKA
INDIAN OCEAN
75°00'E
95°00'E
30°00'N
10°00'N
N
0 100 200 300
Kilometers
INDIA
COAL PORTS PROJECT
(as completed)
Coal Field
National Capital
City/Town
Project Port
Major Port/Port City
Thermal Power Station (Project Related)
Rail Route (Project Related)
Rail Route (Paradip-Ennore)
Sea Route (Project Related)
State Boundary
International Boundary
Boundaries are not necessarily authoritative.
NCTPS - North Chennai Thermal Power Station
ETPS - Ennore Thermal Power Station
MTPS - Mettur Thermal Power Station
TTPS - Tuticorin Thermal Power Station

Map

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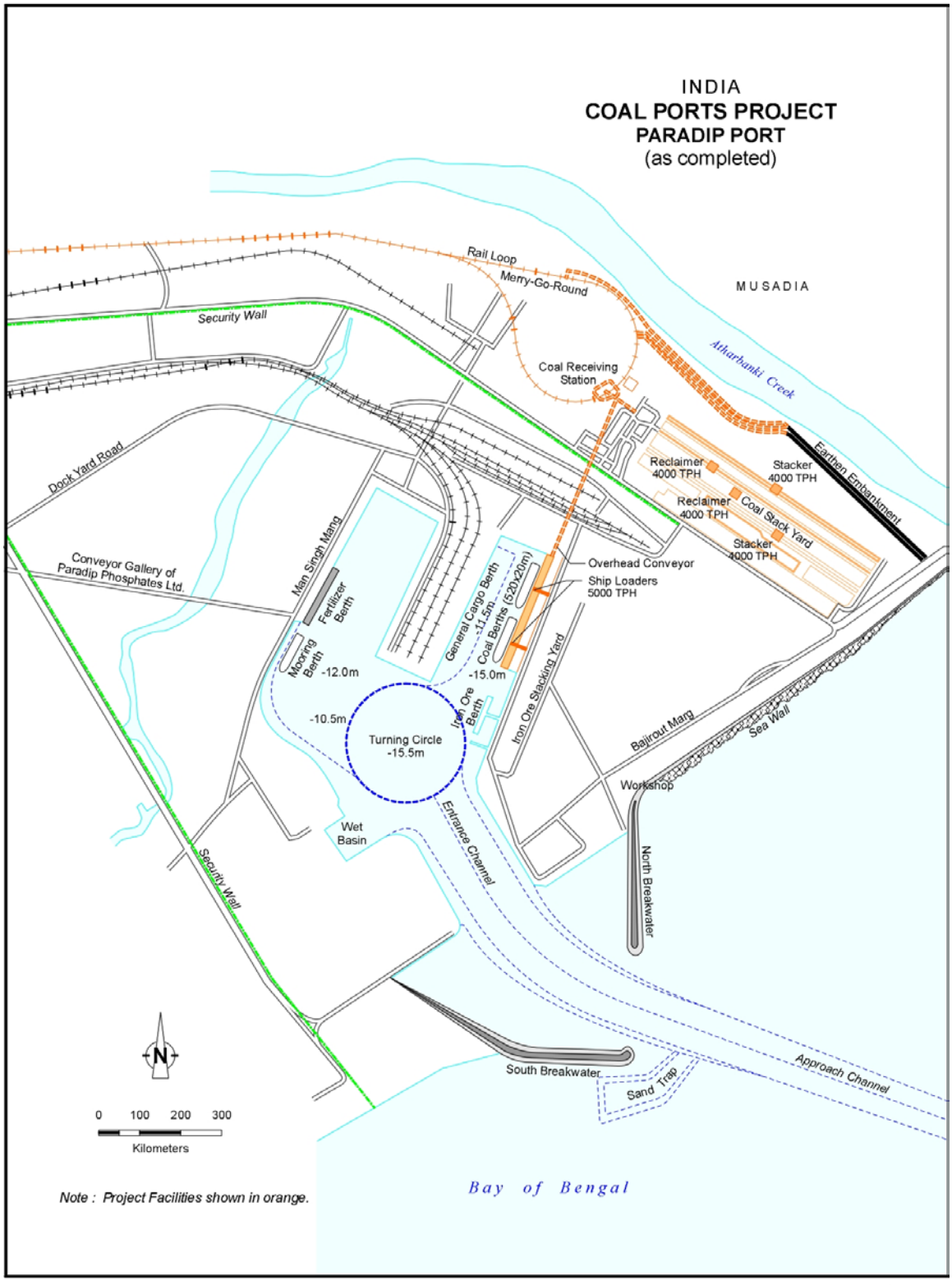
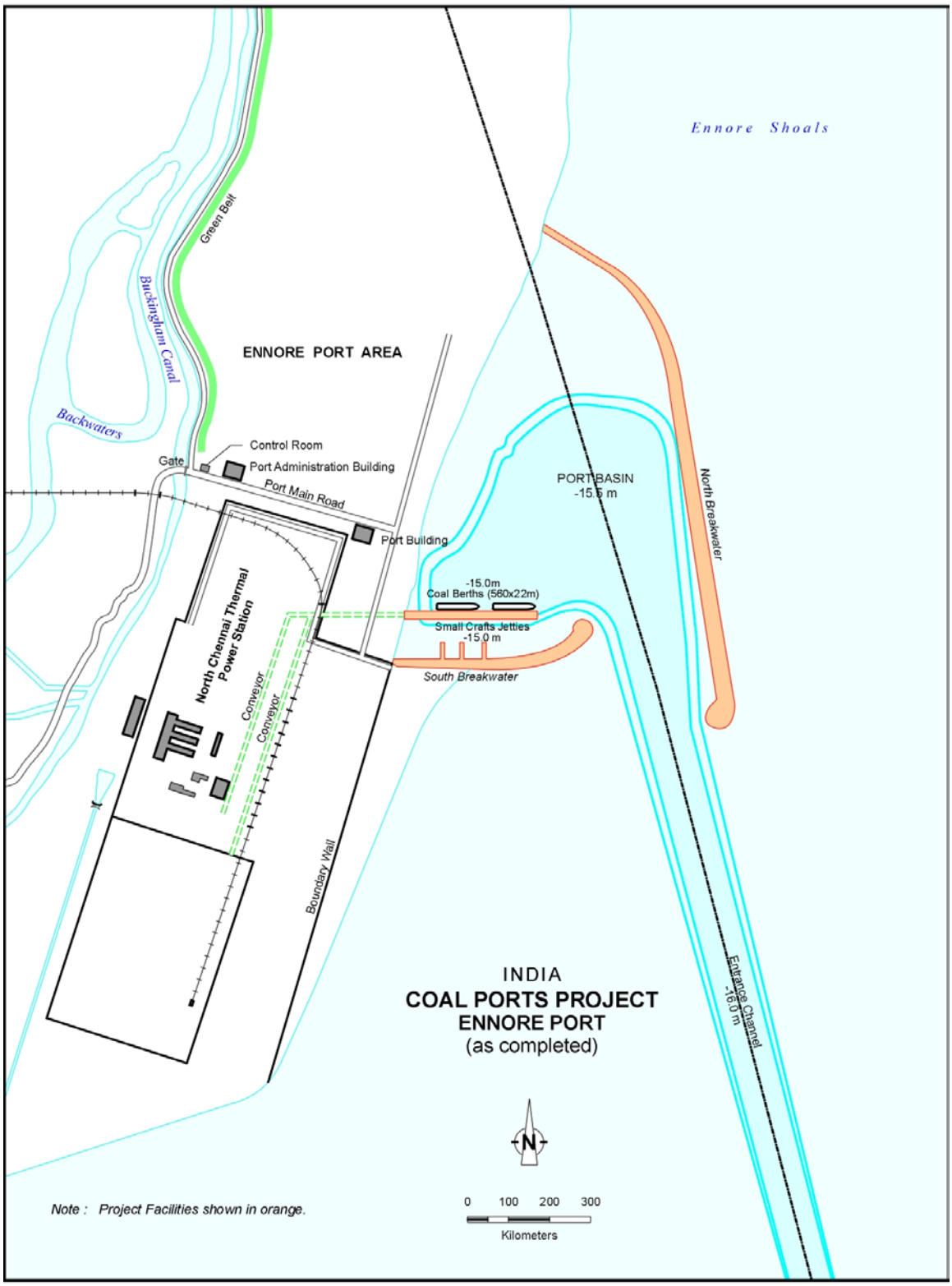
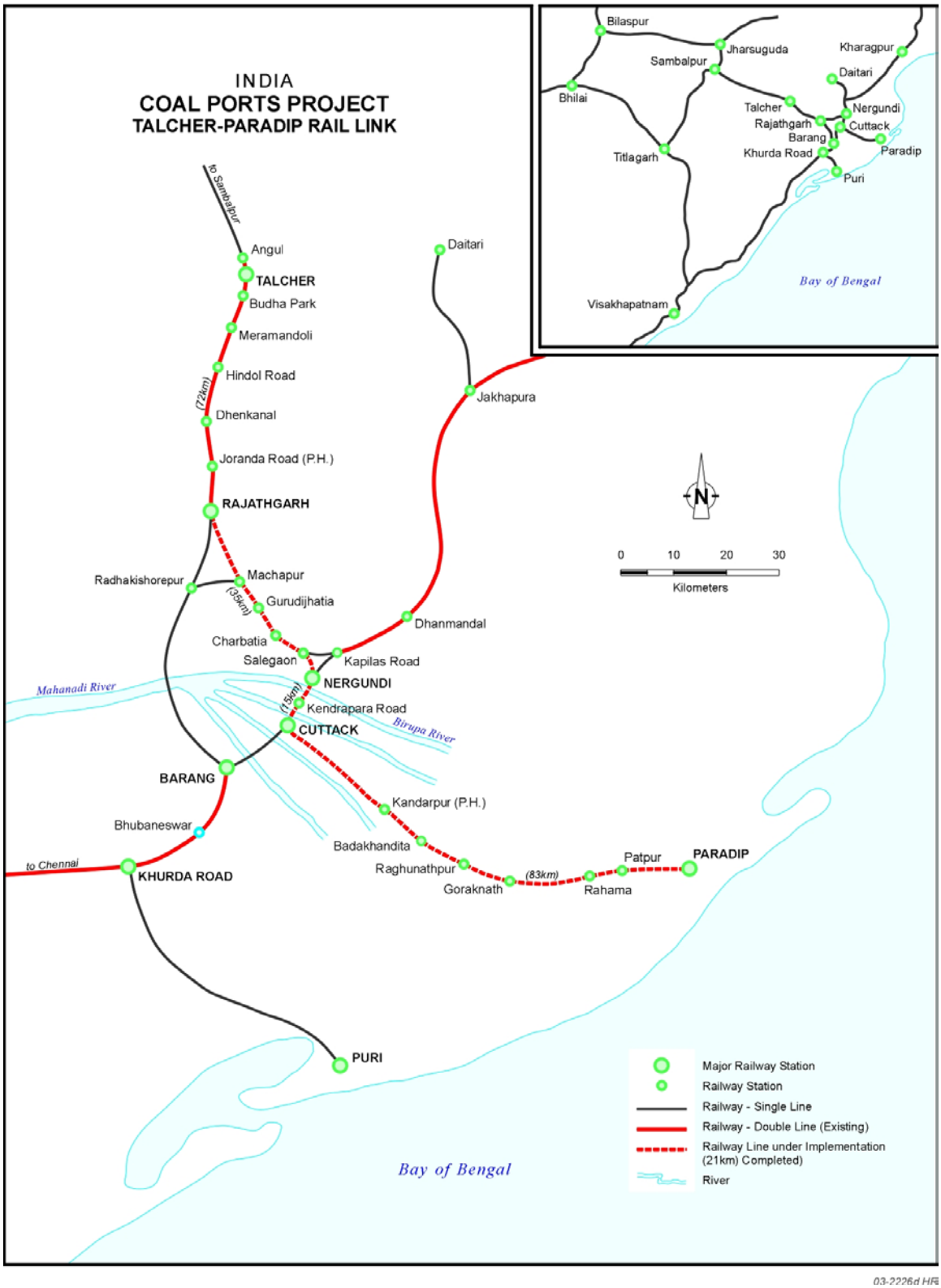
Map 2


INDIA
COAL PORTS PROJECT
PARADIP PORT
(as completed)
MUSADIA
Rail Loop
Merry-Go-Round
Security Wall
Coal Receiving Station
Atharbanki Creek
Earthen Embankment
Dock Yard Road
Reclaimer 4000 TPH
Stacker 4000 TPH
Reclaimer 4000 TPH
Coal Stack Yard
Stacker 4000 TPH
Conveyor Gallery of Paradip Phosphates Ltd.
Main Singh Marg
Fertilizer Berth
Mooring Berth
-12.0m
General Cargo Berth -11.5m
Coal Berths (5)(20x20m)
-15.0m
Overhead Conveyor
Ship Loaders 5000 TPH
Iron Ore Stacking Yard
Iron Ore Berth
-10.5m
Turning Circle -15.5m
Bajirout Marg
Sea Wall
Workshop
Wet Basin
Entrance Channel
North Breakwater
Security Wall
N
0 100 200 300
Kilometers
South Breakwater
Sand Trap
Approach Channel
Bay of Bengal
Note : Project Facilities shown in orange.
03-2226b HR

Map 3


Ennore Shoals
Green Belt
Buckingham Canal
Backwaters
ENNORE PORT AREA
Control Room
Gate
Port Administration Building
Port Main Road
Port Building
PORT BASIN
-15.5 m
North Breakwater
-15.0m
Coal Berths (560x22m)
Small Crafts Jetties
-15.0 m
South Breakwater
North Chennai Thermal Power Station
Conveyor
Conveyor
Boundary Wall
Entrance Channel
-16.0 m
INDIA
COAL PORTS PROJECT
ENNORE PORT
(as completed)
N
0 100 200 300
Kilometers
Note : Project Facilities shown in orange.
03-2226c HFi

Map 4


INDIA
COAL PORTS PROJECT
TALCHER-PARADIP RAIL LINK
Bilaspur
Jharsuguda
Kharagpur
Sambalpur
Daitari
Bhilai
Talcher
Nergundi
Rajathgarh
Cuttack
Barang
Paradip
Titlagarh
Khurda Road
Puri
Visakhapatnam
Bay of Bengal
to Sambalpur
Angul
TALCHER
Budha Park
Meramandoli
Hindol Road
(72km)
Dhenkanal
Joranda Road (P.H.)
RAJATHGARH
Daitari
Jakhapura
Radhakishorepur
Machapur
(35km)
Gurudijhatia
Charbatia
Salegaon
Kapilas Road
Dhanmandal
NERGUNDI
(15km)
Kendrapara Road
CUTTACK
Mahanadi River
Birupa River
BARANG
Kandarpur (P.H.)
Bhubaneswar
Badakhandita
Raghunathpur
Goraknath
(83km)
Patpur
Rahama
PARADIP
to Chennai
KHURDA ROAD
PURI
Bay of Bengal
N
0
10
20
30
Kilometers
Major Railway Station
Railway Station
Railway - Single Line
Railway - Double Line (Existing)
Railway Line under Implementation
(21km) Completed)
River
03-2226d HR

I. PROJECT DESCRIPTION

1. The Project's objectives were to support India's industrial and economic development by establishing an economic and efficient transportation link involving the transport of coal via a rail-cum-sea route from Talcher coalfields in Orissa to thermal power plants in the state of Tamil Nadu.

2. Coal is the most important electricity generating fuel in India. The majority of coal reserves lie in the eastern Indian states of Orissa, Jharkhand, Bihar, and West Bengal. The Project was formulated following the Government's decisions to use domestic coal for power generation and generally locate thermal power stations close to the coast, taking into consideration, among other factors, (i) the economy, which would be achieved by locating power stations near load centers, as opposed to near mine-heads (coal transportation cost vis-à-vis transmission cost); (ii) the need to reduce the concentration of air pollution through locating power stations away from mine heads; (iii) the availability of cooling water; and (iv) the feasibility of transport infrastructure. The Tamil Nadu Electricity Board (TNEB) embarked on a substantial expansion program, to narrow the gap between demand and supply of electricity, which since the 1980s has constrained Tamil Nadu's industrial growth. The Asian Development Bank (ADB) provided loans[1] to India, to augment Tamil Nadu's power-generation capacities.

3. In India, bulk cargo, including coal, was traditionally transported, especially over long distances, through rail routes. A series of studies, however, determined that a rail-cum-sea route would be the least cost mode to transport coal from Talcher coalfields to the designated thermal power stations in Tamil Nadu.

4. At the time of the Project's appraisal (July 1992), it was estimated that TNEB's generating capacity would grow to 4,470 megawatts (MW) by 2001. In line with this, coal demand would increase to 18.8 million tons per annum (MTPA). The demand was further estimated to grow to 32 MTPA by the year 2010. It was estimated that 16.1 MTPA of coal would be loaded at Paradip and 14.2 MTPA of coal would be unloaded at Chennai or Ennore in 2001.

5. Given the capacities of various transport links (from the Talcher coalfields to the state of Tamil Nadu) in the transportation chain existing at the time of the Project's appraisal and the estimated requirements up to 2001, the Project was conceptualized and designed to provide faster, cheaper, and more efficient transportation of coal to power plants in Tamil Nadu. Improved transportation would then enable these plants to better supply power to meet the state's rapidly growing industrial, commercial, and household demands. The Project was in line with ADB's operational strategy, which called for support to industry and removal of infrastructure bottlenecks.

6. An important component of the Project was the development of a new port at Ennore, near the North Chennai Thermal Power Station (NCTPS), north of Chennai (earlier called Madras). Chennai's existing port handled 25 MTPA of cargo during FY1991, including 4.5 MTPA of thermal coal, 10 MTPA of oil and petroleum products, and 6 MTPA of iron and other ores. Traffic at the existing container terminal increased after the completion of the ADB-financed container terminal that accounts for 1 MTPA of the remaining cargo. At the time, thermal coal, for which a temporary facility had been created, was handled at Chennai port. This

[1] Loan No. 798-IND: *North Madras Thermal Power Project* (valued at $150 million, approved 18 November 1986). Loan No. 1029-IND: *Second North Madras Thermal Power Project* (valued at $200 million, approved 30 August 1990).

had created an environmentally undesirable situation, as the port was located near the city's center, and any further increase in dusty and hazardous coal cargo would have been an environmental and health hazard. Activities at Chennai port, particularly container and dry bulk cargo handling, were adding to traffic congestion in the city. It was therefore decided to develop a new port at Ennore, which would improve environmental quality around Chennai port and allow further expansion of the port's container and other break bulk cargo facilities. In line with the Government's reform process, and after discussions with ADB, it was agreed that the new port (to be built under the Project at Ennore) would be established as a separate and autonomous entity—with its own corporate structure, consistent with the Indian Companies Act, 1956—outside the purview of the Major Port Trusts Act, 1963.

7. The Project's key components funded through the $285 million ADB loan, approved on 27 October 1992, are

(i) the new port at Ennore, which included (a) construction of two berths for ships up to 65,000 deadweight tons (dwt); (b) capital dredging of the approach channel and harbor basin; (c) construction of south and north breakwaters; (d) civil works on shore, such as coastal protection activities and utilities and amenities construction; (e) procurement of floating crafts for port operations; (f) procurement and installation of navigation aids; and (g) engineering and supervision activities; and
(ii) the Expansion of Paradip port, which included (a) construction of two berths for ships up to 65,000 dwt; (b) capital dredging of the approach channel and harbor basin; (c) civil works on shore, such as utilities and amenities construction; (d) procurement of floating crafts for port operations; (e) supply and installation of coal handling equipment; and (f) engineering and supervision activities.

8. In addition to the components listed above, other components that were required to complete the transportation chain, to be funded and implemented by various agencies for successful project operation, included the following:

(i) augmentation and beneficiation of coal production at Talcher;
(ii) upgrading the railway transport system along the Talcher-Paradip and Ennore-Mettur stretches, with procurement and deployment of adequate bottom opening bottom receiving (BOBR) wagons and rakes;
(iii) 65,000 dwt self-loading ships; and
(iv) coal handling equipment at Ennore and Tuticorin.[2]

9. The Project also comprised two technical assistance (TA) grants: of $600,000, for Planning and Management Advisory Services for Paradip Port Trust, and $670,000, for Policy Reforms in Indian Ports and Shipping Sector.

II. EVALUATION OF DESIGN AND IMPLEMENTATION

10. The main events of project implementation are presented chronologically in Appendix 1.

[2] At the request of the Government, the component was financed from the loan savings of ADB Loan No. 1029-IND: *Second North Madras Thermal Power Project.*

A. Relevance of Design and Formulation

11. At appraisal, ADB's country operational strategy for India was to support India's industrial and economic development by alleviating infrastructure bottlenecks and improving effective use of existing industrial capacities. The Project was intended to provide an upgraded rail-cum-sea transportation facility for the cheap, efficient, fast, and safe transport of coal between Talcher coalfields in Orissa, and, Ennore, and Tuticorin in Tamil Nadu, to meet the estimated coal demand for the generation of thermal power in Tamil Nadu's power-deficient areas. The new port at Ennore was intended to create additional commercial activities and promote employment and the economic development of the state. The Project was highly relevant at the time of appraisal, and it remains relevant today.

12. The underlying logic of the Project was to meet the requirements of coal transportation, to cater to the power-generation capacities of 1,710 MW (existing at appraisal) and 2,760 MW proposed by TNEB, (the sole user of the Project's facilities and the purchaser of the coal), to meet the power deficit in Tamil Nadu. Mahanadi Coalfields Limited (MCL) was to supply the required quantity of coal. It was anticipated that 16.10 MTPA of coal would be shipped year-round, from the two berths at Paradip; 14.20 MTPA of coal would be unloaded at Ennore port; and a balance of 1.9 MTPA would be unloaded at Tuticorin port by 2001, in the first stage, to meet TNEB's requirement of generating 4,470 MW of power through its thermal power generation plants at Ennore, Chennai, Mettur, and Tuticorin. MCL was also required to invest in increasing production of 100-millimeter (mm) sized coal, coal washing, and beneficiation.

13. Under the Phase I development plan, TNEB was able to set up additional power-generation capacities of 630 MW at NCTPS and 630 MW at Tuticorin Thermal Power Station (TTPS). Under the Phase II and Phase III development plans, TNEB signed agreements with two private sector firms to set up an additional generation capacity of 1,500 MW at NCTPS. However, the firms could not achieve financial closure, resulting in the cancellation of the concessions granted to them.

14. Under deregulation measures in the power sector, an additional capacity of 1,500 MW was set up and commissioned at Talcher in 2003, with a further 1,500 MW scheduled to be commissioned by 2006. The power generated is supplied to power deficient states in southern India through Power Grid Corporation of India's Talcher-Kolar long distance transmission line.

15. Although the components of the Project financed under the loan were adequately planned and each component was suitably designed to meet coal demand, these are operating at less than 50% of their intended capacities, due to the developments cited above. MCL has also not set up the required infrastructure for the washing, sizing, and beneficiation of coal.

16. TNEB and MCL, as the sole users and beneficiaries and the purchaser and supplier of coal, do not have any financial stake whatsoever in the investments made by Chennai Port Trust (CHPT) and Paradip Port Trust (PPT) to create an additional infrastructure facility. This is recognized as a major shortcoming in the formulation of the Project, given the demand scenario at the completion of the Project. Nonetheless, the above problems have been offset by setting adequate tariffs on a cost-recovery basis, to be paid by TNEB. The Project's formulation, with regard to fostering a rail-cum-sea route for the transportation of coal over long distances, has been very relevant, due to the efficiencies and economy involved.

B. Project Output

17. The Project comprised several components of the transport chain. These components were to be financed and implemented by various agencies and institutions, and they formed important links for the Project's success. ADB financed some of these components and other agencies, using their own resources, were to finance the remaining components. A detailed description of project outputs is in Appendix 2. A brief status report on the completion of the Project's components is below.

1. ADB-Financed Components

a. Paradip Port

18. The components envisaged at appraisal were completed, but with substantial delays. Compared with the envisaged capacity of 16 MTPA, two berths were constructed, each equipped with two ship-loaders of a rated capacity of 5,000 tons per hour (tph), to handle about 20 MTPA of coal. The major components that were undertaken were (i) capital dredging of the approach channel and harbor basin, up to a draft of 15 meters (m), in order to handle ships up to 65,000 dwt; (ii) constructing mechanized coal handling plants (MCHP), to receive and dispatch coal; (iii) installing two stackers and reclaimers, each with a 5,000 tph rated capacity, and creating a coal stockyard; (iv) constructing a railway line, exchange yard, 8-kilometer (km) railway merry-go-round system (to receive coal in BOBR wagons), and related buildings; (v) procuring a tug and pilot launch; (vi) installing night navigational aids; (vii) implementing environmental protection works; and (viii) using consulting services. Although the signaling system for the railway merry-go-round system has not been implemented, because the designs are being finalized, this has not created a bottleneck, as the current system meets the present requirement of about 8 MTPA of coal without the signaling system.

b. Ennore Port

19. The components envisaged at appraisal were completed under the Project, but with substantial delays. Compared with the envisaged capacity of 14 MTPA, two berths were constructed to handle about 16 MPTA of coal. The major components that were undertaken, as envisaged during appraisal, are (i) capital dredging of the approach channel and harbor basin, up to a draft of 16 m in the approach channel and 15.5 m in the port basin, in order to handle ships up to 65,000 dwt; (ii) constructing south and north breakwaters; (iii) carrying out onshore civil works and building facilities (iv) procuring a tug and pilot launch; (v) installing night navigational aids; and (vii) using consulting services. The construction of groynes for shore protection, as a part of the environmental protection works, was not undertaken, because these were not required. Detailed coastal protection and sediment transport studies are being undertaken, to determine the long-term requirements for coastal protection at the port.

2. Non-ADB-Financed Project Components

a. Augmentation and Beneficiation of Coal Production at Talcher

20. In the absence of a coal purchase agreement with TNEB, and despite a government decision requiring all coal transported over a distance of more than 1,000 km to be beneficiated, MCL has not set up a coal washing and beneficiation plant, as envisaged at appraisal, which would reduce the ash content before transporting large volumes of coal over long distances. MCL has not set up facilities to provide 100-mm sized coal for transportation to Tamil Nadu. The

coal supplied by MCL until October 2002 was oversized and caused operational and maintenance problems that affected the transport chain. The coal supplied thereafter has had a high coal dust content, which is causing operational, maintenance, and environmental problems at Paradip port. PPT is having a dialogue with MCL to resolve the issue.

b. Talcher–Paradip Rail Link

21. The Ministry of Railways (MOR) made commitments to (i) provide an adequate number of BOBR wagons to transport coal from Talcher to Paradip and (ii) upgrade the 216-km Talcher–Paradip rail link. The upgrade would have removed capacity constraints, once the transport chain was operational. Since project completion, an average of 8 rakes per day, consisting of 58 BOBR wagons, are unloaded at Paradip, which adequately caters to current demand levels. MOR is in a position to provide additional rakes with BOBR wagons, should there be an increase in the demand for the transportation of coal. MOR has upgraded about 50% of the Talcher–Paradip rail link. The remaining stretches are being upgraded by MOR in various phases, and this is expected to be completed by 2006. The current rail link is not a constraint in meeting the present demand for coal.

c. Self-Unloading/Self-Geared Ships for Coal Transportation

22. It was anticipated that four 65,000 dwt self-unloading ships would be required to transport the forecasted coal throughput. Given the lower than expected throughput, three vessels in the range of 65,000 to 75,000 dwt (two geared and one self-unloading) have been chartered by Poompuhar Shipping Limited (PSL), which is owned by the government of Tamil Nadu, to cater to the requirement. In addition, one geared vessel of 40,000 dwt capacity has been chartered by PSL to ply this route.

d. Coal Handling Equipment at Ennore and Tuticorin Ports

23. TNEB successfully constructed the external coal handling material systems at Ennore and Tuticorin ports, financed through the savings of an earlier ADB loan,[3] to enhance generating capacities in Tamil Nadu.

C. Project Cost

24. At appraisal, the total project cost was estimated at the equivalent of $443 million, comprising $285 million (64% of the total cost) in foreign exchange and the equivalent of $158 million (36% of the total cost) in local currency. ADB's loan of $285 million was to finance the entire foreign currency cost of the project. The total contract value for all project components at the time the contracts were awarded was Rs11,624 million (the equivalent of $316 million), compared with an appraisal estimate of Rs9,061 million (the equivalent of $301 million). The project cost at completion, inclusive of physical and price variations, was Rs13,566 million (the equivalent of $356 million), against the appraisal estimate of Rs11,576 million (the equivalent of $385 million). During project implementation, at the request of the Borrower on three different occasions, a total loan amount of $51.50 million was cancelled.[4] Although the total completion cost for all components in local currency was higher than the value projected at appraisal by about 17%, the loan cancellation of $51.50 million was due to the devaluation of the local

[3] ADB Loan No. 1029-IND: *Second North Madras Thermal Power Project.*

[4] $35.10 million, effective 13 November 2000; $8.00 million, effective 26 June 2001; and $8.41 million, effective 18 April 2002.

currency. The cost of some project components—including (i) construction of berths and coal handling equipment and dredging at Paradip port; and (ii) breakwater construction, miscellaneous civil works, and land acquisition at Ennore port—was considerably underestimated at appraisal. The cost of consulting services for these project components at completion was substantially higher than the appraisal estimate, largely due to a substantial delay in the Project's completion. The cost to the Executing Agencies (EAs), resulting from interest during construction (IDC), were significantly higher than the appraisal estimates, due to delays in project completion. The estimated costs of the Project at appraisal, the cost when the contracts were awarded, and actual completion costs are detailed in Appendix 3. The annual average exchange rates and Indian wholesale price indices used are in Appendix 4.

D. Disbursement

25. The loan approved by ADB on 27 October 1992 was provided from ADB's ordinary capital resources. The Borrower was India. The proceeds were re-lent by the Borrower to CHPT and PPT, in accordance with the Borrower's standard arrangements for development assistance to the major port trusts. Disbursements totaled $233.49 million, out of the original loan amount of $285.00 million, and $51.51 million was cancelled in three stages as loan savings. Although $31.65 million was earmarked for the IDC component, only $21.60 million was capitalized. The Borrower paid ADB an additional $25.50 million in commitment charges and interest up to the loan's closing date. The initial disbursements started on 15 August 1993, and the final disbursement took place on 31 January 2002. The details of the actual and projected disbursements are in Appendix 5. The entire loan was fully repaid by the Borrower on 24 February 2003.

E. Project Schedule

26. At appraisal, the Project was envisaged to be completed by 31 December 1997, and the loan's original closing date was 30 June 1998. The Project was substantially completed and declared commercially operational on 22 June 2001, when the first coal vessel loaded at new coal berths at Paradip port was received at the newly constructed coal berths at Ennore port, after a delay of more than 3 years and 6 months. The loan's closing date was extended thrice, up to 31 December 2001, to accommodate implementation delays.

27. The reasons for the significant delays in the Project's implementation were as follows:

(i) A 16–month delay in the selection of project consultants and the commencement of engineering designs for the expansion of Paradip port and Ennore port's development, despite ADB approval for advance procurement action and retroactive financing at the time of appraisal. The lost time was attributable to delayed cabinet approval for the Project, lengthy government approval procedures, and a lack of delegation to the EAs of adequate authority to award contracts for consulting services.
(ii) Delays in completing engineering designs and tendering and finalizing bids by the consultant reflecting an unrealistic schedule at appraisal.
(iii) A super cyclone hit the Paradip coastline, in October 1999, and caused substantial damage to some structures and installations.
(iv) Delays in (a) execution of the breakwater construction at Ennore port, due to design modifications; (b) construction of the rail receiving station at Paradip, due to redesign and approval; (c) supply and installation of stackers, reclaimers, and tugs at Paradip port, due to the retendering of contract packages; and

(d) construction of industrial buildings at Paradip port, resulting in an overall delay of 1 year in implementation.

28. The actual implementation schedule is compared with that at appraisal in Appendix 6.

F. Implementation Arrangements

29. Given the complexity of the Project and the number of agencies involved, the Project was monitored at three levels:

(i) A high level steering committee (HLSC), set up by the Borrower in accordance with the Loan Agreement (LA), was headed by the secretary of the Ministry of Shipping (MOS). The committee held 20 high level meetings at quarterly intervals during the Project's implementation period and the final HLSC meeting was held at Paradip port on 21 November 2000.
(ii) After an initial delay, a project implementation cell (PIC) was formed within the MOS, in accordance with the LA. The PIC, headed by the development advisor (DA), ports, was effective in resolving project-related problems.
(iii) Project implementation offices (PIOs) were established within the EAs at CHPT, for the development of Ennore port, and PPT, for the expansion of Paradip Port, after some initial delays. The PIOs, under the direction of the project director, satisfactorily supervised and monitored day-to-day technical and administrative staff. The CHPT and PPT organization charts for the execution of the Project are given in Appendix 7.

G. Conditions and Covenants

30. The conditions for the effectiveness of the LA were met with and the loan was declared effective on 7 July 1993. No covenants were modified, suspended, or waived during implementation. The details of compliance with major covenants are given in Appendix 8. The covenant relating to the functioning of the HLSC was partly complied with, as it was not successful in ensuring the completion of non-ADB-financed project components (LA, Schedule 6, para. 1–4). The covenant relating to the provision of appropriate budget allocations, timely upgrading of Talcher–Paradip railway linkages, and procurement of BOBR wagons (to meet the forecasted traffic and enable the operation of project facilities at the installed capacity) was partly complied with (LA, Schedule 6, paras. 11 and 12). The covenant relating to the suitable preparation of coal for mechanized coal handling systems—i.e., crushing coal to the required size—and its beneficiation was not complied with (LA, Schedule 6, para. 14). Partial compliance with covenants outlined in the LA, Schedule 6, paras. 12, 15, and 17 and the Project Agreement (PA) with CHPT, Schedule , para. 13 had no significant impact on project implementation. The other major covenants under the loan were generally complied with, after some delays.

H. Related Technical Assistance

31. ADB financed two grant-based advisory TA activities associated with the loan.[5] The objectives of TA 1770-IND were to (i) improve PPT's engineering and financial capabilities and its ability to prepare corporate plans; (ii) assist PPT's management in improving its bulk material

[5] TA No. 1770-IND: *Planning and Management Advisory Services for Paradip Port Trust* (valued at $600,000, approved 27 October 1992) and TA No. 1771-IND: *Policy Reforms in Indian Ports and Shipping Sector* (valued at $670,000, approved on 27 October 1992).

handling operations; (iii) train operational personnel to carry out adequate preventive maintenance on new coal handling equipment; and (iv) achieve improved, efficient, and effective port performance. The primary objectives of TA 1771-IND were to (i) formulate a broad-based strategy for privatization in the ports and shipping sector; and (ii) develop measures for achieving the goals of improved capacity, operational efficiency, and productivity that would respond to user requirements in the 21st century and reduce public funding.

32. The objectives and timing of the TA activities were relevant and consistent with the Project's objectives. PPT implemented the recommendations of TA 1770-IND in the areas of computerization in finance, material management, payroll, estate management, monitoring operations and controls of MCHP facilities, pollution control and dust suppression arrangements in various sections of MCHP facilities, and privatization of MCHP operations. A new tariff structure for handling coal through a MCHP has been fixed. Furthermore, PPT is now oriented toward private participation in future port development activities, including the second mechanized iron ore handling plant and oil jetty, through the build-operate-transfer (BOT) route. However, PPT's ability to produce medium- to long-term corporate plans remains marginal.

33. Following the recommendations of TA 1771-IND, the Government embarked on an initiative directed at port privatization and corporatization. Key areas were identified by the Government for private sector participation in the development and operation of major ports, and necessary guidelines were issued to various ports concerning the procedures to be followed for inviting private sector participation. The TA has been generally successful in fulfilling the tasks set out, and its recommendations are broadly being implemented by the Government. A new piece of legislation, to succeed the Major Ports Trust Act, 1963, enabling the privatization initiative is being read in the Parliament. The TA completion reports are shown in Appendix 9 and Appendix 10.

I. Consultant Recruitment and Procurement

34. In accordance with the LA, and following *ADB Guidelines on the Use of Consultants,* EAs recruited international consulting firms for the expansion of Paradip port and development of Ennore port. The recruitment of consultants for components of both ports was delayed by about 16 months.

35. Procurement of the civil works contracts, goods, and services for the Project was in accordance with *ADB Guidelines for Procurement.* All major civil works contracts were subject to prequalification. Most of the procurement was undertaken through international competitive bidding (ICB) procedures. Contract packaging was generally satisfactory at Paradip and Ennore ports, except the packaging for the ship-loaders, stackers, and reclaimers components at Paradip port. These were initially a part of a single ICB package. However, due to inadequate response during the bidding process, the contract package had to be split into two separate ICB contract packages, one for ship-loaders and the other for stackers and reclaimers. Retendering those two packages resulted in delayed implementation.

J. Performance of Consultants, Contractors, and Suppliers

36. The performance of the international consultants was not entirely satisfactory, owing to the EAs' belief that the international consultants were not familiar with local conditions and were at times not adaptable to project needs. The consultants did not have full powers of the Engineer, which were in accordance with the Fédération International des Ingenieurs-conseils (FIDIC) conditions of the contract. During the course of project implementation, there were

some disputes related to the role that could be assumed by the consultants. The EAs were of the opinion that the consultants overstepped the powers defined in the contract.

37. At Chennai, the EA claimed that financial losses and construction delays were caused when the consultant carried out design changes at a late stage and increased the length of the north breakwater without taking the EA into confidence. The EA also claimed that the consultant was responsible for making excess payments to the contractor. The EA did not extend the consultant's contract beyond 2001 and took on the responsibility for the commissioning of project facilities. Arbitration proceedings are underway between the EA and the consultant.

38. The EA for the Paradip port component claimed that the original design for the rail receiving station (RRS), prepared by the consultant (with an in-motion two-wagon-length concept), was not adaptable to local conditions in the existing Indian railway system and that the consultant's lack of coordination with railway authorities, in agreeing on an acceptable final design for the RRS, resulted in a delay of 22 months. In addition, operational difficulties were encountered when berthing two ships simultaneously, due to improper planning and the locations of the mooring dolphins indicated by the consultant. These difficulties led PPT to demolish the existing dolphin and reconstruct a new dolphin at the coal berth, at additional cost. PPT, too, did not extend the consultant's contract beyond 2001 and commissioned project facilities. Arbitration proceedings are underway between the EA and the consultant.

39. The overall performance of the contractors and suppliers for the expansion of Paradip port were satisfactory, except for the performance of the contractor for the industrial building package, due to further subcontracting and inadvertent and long delays in executing the works. The EA for Ennore port was not satisfied with the performance of the contractor constructing the breakwaters, due to an inordinate delay in execution, which resulted in arbitration proceedings.

K. Performance of the Borrower and the Executing Agencies

40. The overall performance of the Borrower was partially satisfactory. In the initial stages, there were substantial delays in project implementation, due to difficulty in obtaining Cabinet approval for the Project. Although it met frequently, the HLSC, set up by the Borrower, did not succeed in ensuring that (i) additional power-generation capacities were set up by TNEB; (ii) facilities for sizing, washing, and beneficiation of coal were set up by MCL; and (iii) upgrading of the Talcher–Paradip rail link was completed by MOR. A PIC was formed within MOS after some delay. MOS did not delegate adequate powers to the EAs for the implementation of the Project, which resulted in significant delays in the initial stages, the engagement of consultants, and issuing variation orders for the extension of the consultants' contracts.

41. The performance of CHPT and PPT, which have considerable experience in project management, was considered satisfactory. Notably, the EAs took over the role of the Engineer for the Project from the consultants during the later stages of implementation and were able to successfully complete and commission project facilities.

42. Paradip port maintains a PIO headed by a project director and staffed with adequate technical personnel to look after the operation and maintenance work of MCHP, which is being outsourced through private sector participation. The current arrangement of supervision by PIO and hiring operating staff from the erecting contractor has been working well since the plant was commissioned. Ennore port has been corporatized and is functioning as a lean organization, outsourcing all port operations to the private sector.

L. Performance of the Asian Development Bank

43. A significant design oversight by ADB at project formulation was its not including TNEB, the purchaser, and MCL, the supplier, as stakeholders in the Project. Without a stake in the Project, both TNEB and MCL were not bound to fulfill their project obligations.

44. ADB was very closely involved in the resolution of issues related to the Project through regular review missions and frequent monitoring of project progress. ADB provided useful and timely intervention and advice to resolve several issues related to coordination between various agencies involved in the Project's design, procurement, management, and contract administration. ADB approved the evaluation for prequalification of contractors, bid documents, and bid evaluation reports prepared and submitted by the EAs in a timely manner. Project administration was delegated to the India Resident Mission (INRM) on 1 January 1999. ADB's overall performance was satisfactory.

III. EVALUATION OF PERFORMANCE

A. Relevance

45. The Project's main objective was to transport coal at the least cost from Talcher coalfields in Orissa to designated power generation plants in the power deficient state of Tamil Nadu, to support India's industrial and economic development by removing infrastructure bottlenecks and making more effective use of existing industrial capacities. This was consistent with the government and ADB strategy for India's industrial and economic development. The Project was conceptualized, planned, designed, and implemented for the scenario anticipated at the time of its 1992 appraisal. The basic premises on which the Project was undertaken and executed were (i) power should be generated at load centers instead of mine-heads; (ii) domestic coal should be used for power generation; (iii) TNEB, the sole user and purchaser of coal, would set up additional power-generation capacities at existing plants, to meet the power deficit in the state; and (iv) transporting coal through a rail-cum-sea route is cheaper than using an all-rail route.

46. The Project's components were formulated in 1992 and designed, implemented, and finally commissioned 9 years later, in September 2001, based on the above premises. However, during the course of project implementation, due the Government's deregulation initiatives, economic reforms, and commitment to creating an enabling environment for private sector participation, some of these assumptions were no longer valid. The changes were in (i) setting up power generation plants at mine-heads and transmitting power over long distances to load centers; (ii) using alternate sources of raw material for power generation, such as naptha, diesel, gas, and imported coal; (iii) using combined cycle technology, under which coal is used only as a secondary raw material for power generation; and (iv) the nonresponsiveness of the private sector in implementing and commissioning additional capacities in power generation, owing to nonachievement of the project's financial closure. However, even if the Project's facilities are not being used to full capacity, the Project remains relevant to government and ADB objectives. At the time of project completion, there still remained a gap between energy demand and installed capacity for power generation in Tamil Nadu. TNEB has recently signed a memorandum of understanding (MOU) with National Thermal Power Corporation (NTPC) to set up an additional generation capacity of 1,000 MW at Ennore. A generation capacity of 500 MW is scheduled to be commissioned by 2006, and another 500 MW by 2008.This would lead to the near full-capacity utilization of project facilities. A project aim was also to achieve certain sector reform measures and initiatives, such as the corporatization of Ennore port; tariff setting for coal

handling through the facilities created, based on a cost-recovery mechanism; establishment of coastal shipping as an economic and efficient transport solution; enhancement of private sector participation in port operations; and promotion of the "landlord" port concept.

B. Efficacy in Achievement of Purpose

47. Although the links of the least-cost transport chain envisaged through ADB financing under the Project were successfully implemented after a substantial delay, the Project has only been partly successful in meeting the development objectives conceptualized under the Project. The Project has largely been able to provide the facility for the transport of coal for a single facility user, TNEB, which needed to install additional power-generation capacities to meet the rapidly growing industrial, commercial, and household demand for power. However, in addition to the power-generation capacity of 1,710 MW existing at the time of appraisal, TNEB was able to set up only 1,260 MW of the 2,760 MW of additional power-generation capacity needed for the Project's facility to operate near full capacity. The power sector scenario in Tamil Nadu is in Appendix 11. Consequently, MCL has not yet set up suitable infrastructure for the sizing, washing, and beneficiation of coal, and MOR has not upgraded the Talcher–Paradip rail link, which would enable the Project's facility to function at full capacity.

48. Power-generation capacities have been set up recently at the mine-head, and power has been transmitted through transmission lines over long distances. However, long-distance transmission of power through lines could be affected by capacity constraints and limited by the acquisition of rights of way (ROW) when adding lines. The efficacy of setting up a power plant at either the mine-head or the load center is now left to the determination of market dynamics.

49. TNEB, for which PPT and Ennore Port Limited (EPL) built project facilities requiring investments in excess of Rs17,000 million (the equivalent of $442 million), did not have a financial stake or a minimum throughput agreement under the Project, and therefore did not have any binding commitment to install the additional power-generation capacities. The LA did not contain any covenant relating to TNEB's setting up additional power-generation capacities.

50. Based on the TNEB's thermal coal requirements, the coal handled at Ennore port in FY2003 was 8.4 MPTA, against its capacity of 16 MPTA. Similarly, the coal handled at Paradip port in FY2003 was 7.7 MPTA, against its capacity of 20 MPTA. Given the demand/supply gap, there is still optimism that the additional generation capacities, which were expected to be commissioned by TNEB at appraisal, can even now be expected to be fully in place by 2008, enabling the Project's facilities to be used near their full capacities. Cargo traffic information for Paradip and Ennore ports is in Appendix 12.

51. With the gradual transfer of coal cargo to Ennore port, after it was commissioned in 2001, the amount of coal cargo handled at Chennai port has declined to 36.1 MTPA, and it is expected to be 33.5 MTPA during FY2004. These figures are in line with the appraisal estimate. However, while Chennai port has transferred most of the coal handled by it to Ennore port, it has retained its workforce. The future expansion of Ennore port in terms of handling iron ore will result in a loss of cargo for Chennai port and will likely erode the port's revenue. The objectives of converting Chennai into a clean port and improving its environmental quality have been met, with the transfer of coal cargo from Chennai port to Ennore port. Continued handling of coal cargo at Chennai port would have worsened Chennai's environmental and health hazards. In order to use the capacities available now, after transferring coal cargo to Ennore port, CHPT needs to focus on increasing container cargo traffic. CHPT has already awarded the concession

for the operation and maintenance of the container terminal to a private sector operator. CHPT needs to prepare a strategic business plan for its future sustainability.

52. A new port at Ennore constructed with two coal berths for handling 16 MTPA of cargo is currently being under utilized. Although it affected the financial performance of the port in the short term, the construction of new port at Ennore has largely met project objectives. Ennore port has been corporatized and is the first port under a corporate structure in the country. The port has only 16 employees and is outsourcing all services required for its operation and maintenance. It is planned that the port will function as a "landlord" port, and plans for trade and industrial growth in the region have been developed. There are immediate plans for the second phase of port development and commissioning, by the year 2006, on a BOT basis, which will include one coal berth, to handle 8 MTPA of cargo; one iron ore berth, to handle 12 MTPA of cargo in 200,000 dwt ships; and a multipurpose berth, to handle liquid cargo. The port has acquired a total of 445 hectares (ha) of land and plans to lease this for the economic and industrial development of the region. The corporatization status of Ennore port is in Appendix 13.

53. The Project has been quite successful in demonstrating the efficacy of coastal shipping in the long-distance transport of bulk cargo. The shipping mode is efficient and economical, and it is environment friendly. The logistics of augmenting the rail route for coal transport would have required the doubling or tripling of tracks over a length of about 750 km (from Talcher) and the procurement of a huge quantity of new locomotives and wagons and entailed land acquisition over large stretches of the route. While the coastal shipping mode would be able to handle any additional cargo in the long term, through the deployment of more vessels and berths, the rail route would have been unable to cater to the additional cargo, without additional acquisition of ROW. There exists a large potential for the use of coastal shipping in India, which remains underutilized. Recently, a parliamentary committee has recommended that infrastructure status be granted to coastal shipping and a comprehensive policy be prepared by MOS to promote coastal shipping. The current status of coastal shipping in India is in Appendix 14.

54. The port efficiencies have improved tremendously, owing to state-of-the-art mechanized coal handling facilities set up under the Project. A comparison of the port efficiency parameters of project facilities with conventional port facilities is in Appendix 15.

C. Efficiency in Achievement of Outputs and Purpose

55. The Project's financial internal rates of return (FIRR) have been evaluated at 14.6% for the Paradip port component and 5.1% for the Ennore port component. Despite the higher cost of completion and lower cargo traffic, compared to appraisal estimates and projections, the FIRR for the Paradip port component is higher than the FIRR estimate of 8.3% at appraisal. This is due to the application, on a cost-recovery basis, of a Rs200 per ton tariff by the Tariff Authority for Major Ports (TAMP), for the coal handling facility constructed under the Project, reflecting the huge investments made by PPT. Although the FIRR for the Ennore port component is lower than the estimate of 8.0% at appraisal, it is around its weighted average cost of capital (WACC) of 5% in real terms. The tariffs at EPL do not come under the purview of TAMP, as it has been set up as a corporate port under the Indian Companies Act, 1956. The tariffs have been negotiated between EPL and TNEB and set at Rs90 per ton.

56. Ennore Port has been developed as a new port, and the coal handling berths are merely start-up developments under the first phase. It would be inappropriate to consider the coal handling revenue just from the two berths in determining the financial viability of the Project.

Ennore port has been conceptualized to function as a landlord port, operating through concessions granted to the private sector for further construction of additional berths and jetties. Reflecting the plan drawn up by EPL for phase II development, and considering conservative cargo levels, a financial analysis has been carried out that results in an FIRR of 7.1%.

57. Economic reevaluation, following the methodology used at appraisal, has been carried out, and the economic internal rate of return (EIRR) has been evaluated at 17.5%, compared with the appraisal estimate of 22.3%. Details of the methodology adopted for economic and financial reevaluation are given in Appendix 16.

D. Preliminary Assessment of Sustainability

58. Notwithstanding the current low throughput of thermal coal at Paradip MCHP and Ennore port, for TNEB, both PPT and EPL will be able to absorb the financial pressure until a further increase in throughput is achieved, largely due to the setting of tariff rates based on the cost recovery of investments and a fall in interest rates for borrowing in India in recent years. EPL is in the process of lowering its cost of borrowing from 14% per annum to an average of about 10% per annum through the swapping of debt from the Government to commercial banks. EPL has entered into a contract for the sale and recharter of its floating crafts with a private sector firm, thereby recovering the cost of Rs670 million for the floating crafts and retiring some debt. EPL has drawn up a plan for developing Ennore port as its landlord developer. The details of the development plans of EPL are in Appendix 12. The two coal berths constructed under the Project are likely to be significantly underutilized until 2008. Based on the MOU signed between TNEB and NTPC for setting up an additional generation capacity of 1,000 MW in two stages by 2008, those berths will handle a cargo of 9.2 MTPA until 2005, 11.7 MTPA until 2008, and 14.2 MTPA thereafter, against capacity of 16.2 MTPA.

59. PPT has also retired some of its debt to the Government and lowered its borrowing cost. The throughput for coal cargo is expected to be 10.35 MTPA until 2005, 12.7 MTPA until 2008, and 15.05 MTPA thereafter, against a capacity of 20 MTPA. PPT is already assessing the feasibility of exporting iron ore fines through MCHP. There are possibilities that spare capacity at the MCHP can be used to carry coal for other users, including coal diverted from other ports.

60. The coal being handled at Ennore port was transferred from Chennai port. Similarly, future traffic related to iron ore will also be diverted from Chennai port. This will lead to a reduction in the cargo handled at Chennai port and will likely further erode revenue at Chennai port. Although there has been some increase in the container cargo being handled at Chennai port it has not been adequate to compensate for the diverted cargo. The profitability of Chennai port during the next 2 years is likely to be affected. Chennai port needs to formulate a strategy and a business plan to withstand imminent financial problems.

E. Environmental, Social, and Other Impacts

61. Project facilities at Paradip and Ennore were designed to meet the statutory environmental standards stipulated in the environmental clearance certificates of the Ministry of Environment and Forests. Benefit monitoring and evaluation studies were carried out for the facilities, and reports were submitted in November 2000 and February 2000, respectively.

1. Paradip Port

62. During construction, suitable mitigation measures were carried out by the EA to meet the environmental impact caused by expansion works, mainly dredging, landfilling, and stackyard development. During operations, an effective dust suppression system was provided by way of water sprinklers and erecting covered conveyor galleries and transfer houses. A crisis management plan, designed to deal with potential disasters emanating from the new facilities, has been integrated into the port's. Greenbelts have been developed in an area covering about 5 ha surrounding the new facilities. The greenbelts include a plantation of mangroves and trees of various species.

63. About 2,470 squatter and slum dweller families were relocated. The families were moved to an area 3 km away, which was developed and provided with an access road and water and electricity services. Each family was compensated with an allotment of free residential land. PPT spent Rs23.9 million on resettlement. The rehabilitation and compensation efforts satisfied the prevailing norms in India at the time of acquisition and project implementation.

2. Ennore Port

64. The environmental impact during construction was mainly the result of the quarrying activities undertaken for the production of stone material for the breakwaters and marine works. The stones were produced by controlled blasting and sorted and transported to the Melapakkam transfer station, through the shortest possible routes. A mix-mode was adopted and populated areas were avoided, to reduce environmental pollution. No plans for the rehabilitation of the landscape at the quarry site were implemented.

65. Afforestation measures have been targeted in an area of 50 ha, of which 15 ha has been planted with over 8,000 trees of various species. A greenbelt has been developed within the port area and along the banks of the backwaters and Buckingham canal. A low-lying swamp in the north, west of EPL land, has been targeted for the development of mangroves and a groundwater recharge zone. A dust-suppression system, comprising water sprinklers and a covered conveyor gallery, and dust extraction systems were provided at the jetty and at all the junction towers, to contain coal dust, as envisaged during appraisal. A crisis management plan designed to deal with potential disasters has been implemented. A management plan for the conservation of Pulicat lake, an important area for water birds 25 km north of Ennore island, and coastal morphology is being developed.

66. Acquisition of land at Ennore was carried out by Tamil Nadu Industrial Development Corporation (TIDCO), and they took effective rehabilitation and resettlement measures. Of the 445 ha of land presently with EPL, 39 ha were government-owned, 19 ha were privately owned and acquired from Ennore village, 387 ha were acquired from Puzhuthivakkam village and a few small hamlets, altogether involving the displacement of 2030 families. The rehabilitation and compensation efforts satisfied the prevailing norms in India at the time of land acquisition and project implementation and were consistent with the spirit of ADB's *Policy on Involuntary Resettlement*, which did not become mandatory until 1995. The details of environmental monitoring and compliance are in Appendix 17 and social impact details are in Appendix 18.

IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

A. Overall Assessment

67. The transport chain envisaged under the Project involved both ADB-financed and non-ADB-financed components. The ADB-financed components were satisfactorily completed after a substantial delay of more than 3 year and 6 months, but the other components have yet to be completed. TNEB, in addition to the power-generation capacity of 1,710 MW existing at the time of appraisal, was able to set up only 1,260 MW of the 2,760 MW of additional power-generation capacity envisaged for the Project to operate at the intended capacity. Consequently, MCL, the supplier of coal, has not set up facilities for the sizing, washing, and beneficiation of coal, as required under the Project. This has led to the underutilization of the Project's facilities. The Project's facilities will be used nearly to their full capacity by 2008. Nonetheless, PPT and EPL will be able to overcome the financial crunch, through the fixation of adequate tariffs for coal handling at the ports and reduction in the interest cost, resulting from reduced interest rates for borrowing in recent years in India.

68. The Project has enabled the transfer of coal cargo from Chennai port, which has improved the environment around Chennai port and also allows further expansion of the port's container and other break bulk cargo facilities. Moreover, the Project will eventually make for a clean cargo port. The new port at Ennore is the first port in India to be established as a separate and autonomous entity, with its own corporate structure, outside the Major Port Trusts Act, 1957. The port is operating as a landlord port and will outsource all future expansions to the private sector on a BOT basis. The development of Ennore port has created an opportunity for increased economic activity, and the fully mechanized coal transport system has brought in efficiencies in port operations in terms of lower operation and maintenance costs and lower berthing and turnaround times for ships. The Project has also been a successful model, by establishing a system of moving bulk cargo over long distances using coastal shipping as an efficient and cheaper mode of transport. The spare capacities at Paradip port will soon be utilized when the handling of iron ore cargo is expanded.

69. The reevaluated EIRR for the Project is 17.5%, and the reevaluated FIRR for the Paradip port component and Ennore port component are 14.6% and 5.1%, respectively. Taking into consideration the development objectives and implementation, the Project is rated as "partly successful."

B. Lessons Learned

70. The Project was conceptualized and approved at the beginning of the era of economic liberalization and reform in India. Prior to liberalization and reform, major infrastructure investment decisions were largely controlled by the Government . However, during the period of liberalization and reform, the investment decisions were partially deregulated and the private sector, reflecting the market forces, became an instrumental partner in investment decisions. One of the most important lessons learned is that if a project involves major investments to be made by some agencies other than the EA, it is generally not adequate only to set up a high level committee and provision loan covenants ensuring the investments required by the other agencies. All the stakeholders and the beneficiaries of the Project should have a substantial stake, preferably financial, in a project and share its associated design, implementation, and commercial risks.

71. Under the Project, all the design, implementation, and commercial risks were borne by the facility provider. None were borne by the facility users. It would have been a more effective approach to ensure that (i) for all captive dedicated port facilities (those meant for use by a single user), there should be an equitable sharing of the design, implementation, and commercial risks associated with the Project, in the form of equity ownership, debt provision, and sharing of costs and revenue between the facility provider and the facility user; (ii) a minimum annual throughput agreement should be in place between the various facility providers and the facility users; and (iii) the minimum throughput agreement should also include a provision on the assured opening date of the facility and penalties for any delay in opening.

72. Reflecting the disputes between the EAs and the consultants, systems for ensuring the accountability of consultants, such as professional liability insurance, should be devised and built into consultancy contracts.

73. Although ADB approved advance action on the recruitment of consultants and retroactive financing for the preparation of design and bid documents for the Project's components at the request of the Government, the benefits of the approval did not materialize, owing to the substantial delay of about 16 months in the appointment of the consultants. Lack of adequate delegation of powers to the EAs in the appointment of consultants resulted in the delay. Although there were other implementation delays caused by the EAs, the time needed for design, bid preparation, and awarding works was not estimated in a realistic manner during appraisal. There is a need for appraisal missions to more carefully estimate the time required for such complex infrastructure works.

C. Recommendations and Conclusion

74. Monitoring the following activities is critical in ensuring that the objectives of the Project are successfully achieved and outstanding covenants are complied with:

(i) signing of a coal supply agreement between TNEB and MCL;
(ii) progress on the implementation of the installation of 1,000 MW of power-generation capacity at NCTPS under an MOU with NTPC, to ensure increased use of project facilities;
(iii) completion of the signaling works for the rail link between Paradip railway station and Paradip port;
(iv) completion of the upgrading work on the rail link between Paradip and Talcher;
(v) setting up of sizing, washing, and beneficiation of coal facilities at MCL; and
(vi) testing the MCHP at its full rated capacity and appropriate arrangements for the operation of the plant.

75. A Project Performance Audit Report is recommended for 2006, by which time progress on the implementation of the activities mentioned in para. 74 (above) is likely to have been made.

CHRONOLOGY OF MAIN EVENTS DURING PROJECT IMPLEMENTATION

Date	Event
1986	
27 Jan–12 Feb	Fact-Finding Mission (for Loan No. 1016-IND: *Second Ports Project*, valued at $129.0 million and subsequently approved on 29 March 1990). The scope of the proposed project for transportation of coal from Talcher (Kalinga) coal fields in Orissa to North Chennai Thermal Power Plant in Tamil Nadu, through the rail-cum-sea mode, which was contemplated as a possible least cost solution, was discussed.
1987	
2–14 Feb	Reconnaissance Mission. The mission discussed the findings of a study aimed at the selection of the least-cost mode for the transportation of coal from Talcher (Kalinga) coalfields in Orissa to North Chennai Thermal Power Plant in Tamil Nadu, and it investigated the need for a project study for the development of the selected mode (the rail-cum-sea mode).
20–23 Jul	Follow-up Mission 1. The mission discussed the arrangements being made by the Government to undertake a feasibility study for the proposed coal transportation project, which would provide an assured transportation link from the mines at Talcher (Kalinga) coalfields in Orissa to North Chennai Thermal Power Plant in Tamil Nadu.
24 Sep	The Asian Development Bank (ADB) approved the first loan to India in the port sector, Loan No. 842-IND: *Ports Development Project*, valued at $87.6 million.
1988	
12–16 Feb	Follow-up Mission 2. The mission followed-up on the progress of the feasibility study for the proposed coal transportation project.
29 Mar	ADB approved the second loan to India in the port sector, Loan No. 1016-IND: *Second Ports Development Project*, valued at $129.0 million.
1990	
19 Sep–9 Oct	Fact-Finding Mission.
1991	
12–27 Feb	Follow-up Fact-Finding Mission.
15 Apr	Management review meeting.
6–23 May	Appraisal Mission.
1992	
30 Mar–13 Apr	Follow-up Appraisal Mission.
29 Jun–3 Jul	Loan negotiations.
14 Aug	Board circulation.
27 Oct	Board approval.

1993

1–7 Feb	Special Loan Administration Mission (1). The mission followed-up on the implementation of the Project, especially on the selection of consultants for detailed engineering, which had been considerably delayed.
12 Feb	Loan Agreement signed.
29 Sep–7 Oct	Special Loan Administration Mission (2).
25 Nov–5 Dec	Contract Administration Mission (1). The mission attended the contract negotiations for consulting services held by Paradip Port Trust (PPT) with the first-ranked firm as an observer.
7 Jul	Loan was declared effective.

1994

30 Apr	Consulting services contract for detailed engineering and construction supervision for the expansion of Paradip port awarded, valued at A$13.43 million.
17–22 Apr	Contract Administration Mission (2). The mission attended the contract negotiations for consulting services, held by Chennai Port Trust (CHPT) with the first-ranked firm as an observer.
17 Aug	Consulting services contract for detailed engineering and construction supervision for the construction of a new port at Ennore awarded, valued at F18.29 million and $0.60 million.
27 Nov–7 Dec	Review Mission (1). The mission reviewed the implementation status of the expansion works at Paradip port and the construction of the new port at Ennore.
22 Jun	First disbursement under the loan.

1995

13–16 May	Special Review Mission. The mission reviewed and assessed the status of the upgrading of the Talcher–Paradip railway link, following the commitment of the Government, as specified under the Project.
16–30 May	Review Mission (2). The mission reviewed the implementation status of the expansion of Paradip port and development of Ennore port. The overall status of implementation of the Project and related issues were discussed in meetings with the Executing Agencies, namely, PPT and CHPT, as well as with the Ministry of Surface Transport (MOST), Department of Economic Affairs, Tamil Nadu Electricity Board (TNEB), South Eastern Railways, and with the design and supervision consultants for both components of the Project.
18–29 Nov	Review Mission (3). The mission reviewed the scope and financing arrangements for the external coal handling system at Ennore port.
15 Dec	Contract for dredging works at Paradip port awarded, valued at Rs180.07 million.

1996

12–19 May	Review Mission (4). The mission reviewed the implementation status of the expansion of Paradip port and development of Ennore port. The mission discussed with officials of PPT issues related to contract awards, the project procedure manual prepared by the consultants, project cost, and railway works. The mission discussed with officials of CHPT issues related to port layout, rock quarrying and transportation, breakwater construction, project cost, the project procedures manual prepared by the consultants, land acquisition, the external coal handling system, the establishment of project implementation office, the status of compliance with loan covenants and the contract schedule.
28 May	Contract for a landfill at Paradip port awarded, valued at Rs22.34 million.
6 Jun	Contract for rock quarrying and transportation for breakwater construction at Ennore port awarded, valued at Rs1,195.22 million.
19 Sep	Contract for construction of wharf at Paradip port awarded, valued at Rs651.48 million.
21–28 Sep	Review Mission (5). The mission discussed with officials of PPT issues related to contract awards, revised cost estimates, and railway works. The mission discussed with officials of CHPT issues related to land acquisition, rock quarrying and transportation, road work from the quarry site to the transfer stations, work at Melpakkam and Ennore transfer stations, contract packaging, revised cost estimates, coastal protection works, staffing for project implementation office, and the external coal handling system.

1997

22 Jan	Contract for high-voltage electrical works at Paradip port awarded, valued at Rs76.70 million.
30 May–13 Jun	Midterm Review Mission. The mission reviewed the implementation status of the expansion of Paradip port and development of Ennore port. The mission discussed with officials of PPT issues related to contract awards, bid evaluation, the project schedule, revised cost estimates, procurement of bottom opening bottom receiving wagons, and Talcher–Paradip rail link. The mission discussed with officials of CHPT issues related to port layout and land acquisition, rock quarrying and transportation, the port site access road, contract packaging, coastal protection works, the project schedule, staffing for the project implementation office, and the external coal handling system.
14 Aug	Contract for civil works for mechanized coal handling system at Paradip port awarded, valued at Rs1,723.74 million.
21 Aug	Contract for the onshore civil works (railway line) of Paradip port awarded, valued at Rs407.99 million.
22 Aug	Contract for the construction of breakwaters for the development of the new port at Ennore awarded, valued at Rs1,497.00 million, $9.30 million, and F23.80 million.
22 Aug	Contract for the construction of wharfs for the development of the new port at Ennore awarded, valued at Rs493.02 million and $2.47 million.

22 Aug	Contract for capital dredging works in the port basin and entrance channel at Ennore awarded, valued at Rs63.00 million and F37.84 million.
26 Aug	Contract for onshore civil works (services) at Paradip port awarded, valued at Rs103.90 million.

1998

6 Feb	Contract for two 4,000 ton per hour (tph) capacity slewing and luffing coal stackers and two slewing and luffing bucket wheel coal reclaimers at Paradip port awarded, valued at $0.51 million, £2.69 million, DM1.91 million, and Rs460.76 million.
21 May	Contract for construction of security wall at Paradip port awarded, valued at Rs39.66 million.
9 Jun	Contract for construction of industrial buildings at Paradip port awarded, valued at Rs134.33 million.
30 Jun	Original loan closing date.
31 Aug	Contract for supply and delivery of control system, including spares and incidental services, at Paradip port awarded, valued at Rs20.70 million and $0.40 million.
30 Oct	Contract for the supply and erection of two coal loaders at Paradip port awarded, valued at DM11.58 million and Rs240.08 million.
29 Oct–6 Nov	Review Mission (6). The mission discussed the problems relating to the working relationship between the consultants and the officials of the Executing Agency, CHPT.
6 Nov	Contract for the supply and delivery of a pilot launch, including spares and services, toward the expansion of Paradip port, awarded, valued at Rs24.85 million.
21 Dec	Contract for the supply of three tugs and two pilot craft, toward the development of Ennore port, awarded, valued at Rs309.65 million, $2.49 million, DM4.86 million, and F2.14 million.

1999

1–12 Feb	Review Mission (7). The mission visited Chennai, Ennore, Bhuvaneshwar, Sambalpur, and Paradip to carry out a comprehensive review of the Project. The mission assessed and reviewed the overall progress of the implementation of the Project, the implementation arrangements, bottlenecks hampering progress, project costs, and the status of various linkages associated with the Project. It also recommended appropriate solutions. The mission discussed these aspects with MOST, CHPT, PPT, and TNEB officials and the consultants and contractors.
27 Jul–2 Aug	Review Mission (8). The mission visited Paradip, Chennai, and Ennore to carry out a comprehensive review of the Project. The mission reviewed and assessed the overall progress of the implementation of the Project, the implementation arrangements, bottlenecks hampering progress, project costs, compliance with loan covenants and Y2K, the status of contract awards, expected disbursements during CY1999, and the status of various linkages associated with the Project. It also recommended appropriate solutions.

12 Jun	Contract for the procurement of a conveyor belt at Paradip port was awarded, valued at Rs104.70 million.
29 Jun	Contract for the procurement of tug boats at Paradip port awarded, valued at Rs49.02 million and $1.74 million.
6 Oct	Contract for the procurement of navigational aids at Ennore port awarded, valued at Rs18.98 million.
11 Oct	The Government incorporated Ennore Port Limited (EPL) to take over the assets and operations of the port facilities at Ennore, developed under the Project, in accordance with the covenants of the Loan Agreement.
14–19 Nov	Review Mission (9) and Audit Mission. The mission visited Chennai and Ennore to review the implementation of the Ennore port component and the status of the compliance of loan covenants and conduct a random audit of the Executing Agency's procurement and disbursement procedures.

2000

11–15 Jan	Review Mission (9) and Audit Mission. The mission visited Paradip to review the implementation of the Paradip Port component, disbursements, utilization of savings, and status of compliance of loan covenants and conduct a random audit of the Executing Agency's procurement and disbursement procedures.
28 Feb	Contract for the supply of one 10-ton mobile maintenance vehicle, one 10-ton belt slicing vehicle, and spares at Paradip port awarded, valued at Rs11.53 million.
28 Feb	Contract for the supply of a rough terrain crane with a 75-ton capacity at Paradip port awarded, valued at Rs18.05 million.
21–26 May & 17–19 Jul	Review Mission (10). The mission met with officials of CHPT, consultants, and contractors to discuss project implementation issues, compliance with loan covenants, disbursements, extension of the consultants' agreement, and other issues related to the coal transportation chain. The mission met with officials of PPT, consultants, and contractors to discuss project implementation issues related to the mechanized coal handling system, stackers and reclaimers, ship-loaders, and railway package and consulting services contracts. Other issues related to compliance with loan covenants, disbursement status, and relocation of villagers were also discussed.
30 May	First extended loan closing date.
31 Dec	Second extended loan closing date.
13 Nov	First partial cancellation of loan amount of $35.10 million.

2001

27–30 Mar	Review Mission (11). The mission discussed the status of project implementation, disbursements, the consulting services contract, and compliance with loan covenants with officials of PPT, CHPT, and the Ministry of Shipping. The format for the preparation of the Project Completion Report was also provided to the officials of PPT and CHPT.
26 Jun	Second partial cancellation of loan amount of $8.00 million.
31 Dec	Third extended loan closing date.

3–7 Dec	Review Mission (12). The mission met with officials of CHPT and EPL and discussed project implementation issues, compliance with loan covenants, and disbursement status.

2002

18 Apr	Third and final partial cancellation of loan amount of $8.41 million.
18 Apr	Loan closed.

2003

19 Mar–3 Apr	Project Completion Review Mission. The mission visited the project facilities at Ennore and Paradip and met with officials of CHPT, EPL, and PPT to discuss the status of project completion, compliance with major loan covenants, project costs, and to seek the requisite information for assessing the economic and financial viability of the Project and the preparation of the Project Completion Report.

DETAILS OF PROJECT OUTPUTS

A. Details of the Project Components Financed Under the Loan

1. Expansion of Paradip Port

1. The project components for the expansion of Paradip port comprised the following works:

(i) construction of two piled-structure berths, totaling 520 meters (m) in length and 20 m in width, for berthing ships weighing up to 65,000 deadweight tons (dwt) at the eastern dock of Paradip harbor;
(ii) construction of railway lines, an exchange yard, and an 8 kilometers (km) merry-go-round system, including related buildings and associated signaling and communications equipment;
(iii) capital dredging works of 2.5 million cubic meters (MMCM) in the port basin up to a 15 m draft;
(iv) creation of a 0.23 MMCM landfill and completion of associated soil improvement works;
(v) construction of a 260,000-square-meter coal stacking yard with a stockpile capacity of 650,000 metric tons (t), including related operations buildings and maintenance facilities;
(vi) installation of coal handling equipment: (2 stackers , 2 reclaimers , 3 feeders under surge bin , 8 plow feeders, 2 ship loaders of a capacity of 5,000 tons per hour (tph) , and conveyor systems that are 1,600 millimeters (mm) and 2,000 mm wide and 18 km long);
(vii) upgrading of power distribution system, with the provision of a 132/33-kilovolt substation, switchboard, and transformers;
(viii) procurement of floating crafts: one 30 t tug , one pilot launch , and aids for night navigation;
(ix) implementation of environmental protection measures, through the provision of a coal dust suppression system, water sprinklers, fire fighting equipment, a water collection/treatment plant, and greenbelt development in a 5-hectare (ha) area; and
(x) use of consulting services for the design of the facilities and construction supervision works.

2. New Port at Ennore

2. The project components for the development of Ennore port comprised the following works:

(i) construction of two piled-structure berths, totaling 560 m in length and 22 m in width, for berthing ships weighing up to 65,000 dwt inside the southern breakwater;
(ii) construction of armor-protected rubble mound breakwaters (a 1,070 m south breakwater and a 3,080 m north breakwater) for the creation of the harbor.;

(iii) implementation of coastal protection measures, by way of beach replenishment north of the port, that involve dumping dredged material to contain erosion (rubble mound groyne for the protection of the shoreline, as envisaged in the consultants' design for shore protection, have not been completed, and studies are being undertaken to ascertain exact protection requirements);
(iv) completion of 14.7 MMCM of capital dredging works in the 3,775 m port approach channel, (the channel was dredged up to a 16 m draft, the harbor basin was dredged up to a 15.5 m draft, and a 9.5 MMCM landfill was created);
(v) completion of onshore civil works, including buildings, roads and bridges, and amenities required for the operation and maintenance of port facilities;
(vi) procurement of floating crafts: three 40 t tugs, two pilot launches, three mooring launches, and navigational aids;
(vii) completion of other environmental protection works, including greenbelt development in a 15 ha area; and
(viii) use of consulting services for design of the facilities and construction supervision works.

B. Details of Project Components Financed by Other Agencies

3. In addition, other project components were required to be completed for successful project implementation. These were to be financed by the Government of India and other agencies. Some of these components have still not been completed. The details of these components and their implementation status are as follows:

1. Coal Production at Talcher

4. Mahanadi Coalfields Limited has increased coal production levels at Talcher to meet current Tamil Nadu Electricity Board (TNEB) requirements. However, the facilities required to be set up at Talcher, including adequate surface miners to produce 100 mm sized coal and a coal washing and beneficiation plant, have not been established.

2. Railway Transport System along the Talcher-Paradip and Ennore–Mettur Stretches

5. Indian Railways has ensured that eight rakes of 58 bottom opening bottom receiving coal wagons each are unloaded at Paradip every day. These are adequate for the current level of coal traffic at Paradip. Similarly, two and four rakes, respectively, are unloaded each day at Ennore and Mettur. These, too, are adequate for the current level of coal traffic at Ennore. However, the doubling of lines along the 206 km Talcher–Paradip section is not yet complete. While the doubling of the 73 km Talcher–Rajatgarh stretch is complete, only 8 km of the 35 km Rajatgarh–Nergundi and 12 km of the 83 km Cuttack–Paradip sections have been completed. The Nergundi–Cuttack stretch is a key to the rail link, as it requires two major rail bridges, one over the River Mahanadi and the other over its tributary. The doubling of the remaining stretch and bridge construction works are in progress and are scheduled to be completed by 2006.

3. 65,000 dwt Self-Unloading Ships

6. A requirement of four 65,000 dwt self-unloading ships was envisaged during the appraisal for transportation of coal between Paradip and Ennore. TNEB has chartered four ships, through Poompahar Shipping Limited, of which three are in the 65,000 dwt to 75,000 dwt range (one of these three is self-unloading and the other two are geared ships) and one is of 40,000 dwt (geared ship).

4. Mechanized Coal Handling Equipment at Ennore and Tuticorin

7. Mechanized equipment for handling coal shipments from Paradip has been set up and is operational at both Ennore and Tuticorin. The equipment was financed from the loan savings of ADB Loan No. 1029-IND: *Second North Madras Thermal Power Project*.

COST BREAKDOWN BY PROJECT COMPONENTS

Item	Appraisal Estimate ($ million) Foreign	Local	Total	Appraisal Estimate (Rs million) Total	Contracted Cost ($ million) Total	Contracted Cost (Rs million) Total	Cost at Completion ($ million) Total	Cost at Completion (Rs million) Total
A. Expansion of Paradip Port								
Base Cost								
Construction of Berths (2)	11.50	6.17	17.67	532.00	18.39	651.48	21.48	778.56
Dredging (about 860,000 cubic meters)	2.15	0.45	2.60	78.00	5.55	180.07	7.86	275.37
Environmental Protection/Soil Preperation at Stackyard	1.90	1.43	3.33	100.00	0.63	22.34	0.63	22.34
Civil Works (amenities, utilities)	12.50	10.56	23.06	692.00	18.31	685.89	18.47	735.71
Coal Handling Equipment	59.80	25.70	85.50	2,565.00	81.30	3,120.13	96.06	3,752.94
Floating Craft	4.30	1.80	6.10	183.00	3.53	150.82	3.34	139.49
Engineering and Supervision	4.26	1.78	6.04	210.00	9.83	308.38	22.21	866.44
Subtotal	96.41	47.89	144.30	4,360.00	137.54	5,119.11	170.05	6,570.85
Contingencies								
Physical Contingency	12.80	6.25	19.05	572.00				
Price Contingency	10.14	10.91	21.05	632.00				
Interest During Construction	15.50	13.15	28.65	860.00	31.33	1,280.72	31.33	1,280.72
Total A	134.85	78.20	213.05	6,424.00	168.87	6,399.83	201.38	7,851.57
B. Development of Ennore Port								
Base Cost								
Breakwater Construction	49.00	21.00	70.00	2,101.00	96.45	3,473.01	94.06	3,453.21
Construction of Berths (2)	10.90	5.90	16.80	504.00	16.05	582.90	15.57	611.21
Dredging (about 8.3 million cubic meters)	21.80	5.50	27.30	819.00	20.94	760.69	22.53	885.05
Coastal/Environmental Protection	3.20	1.30	4.50	136.00	-	-	-	-
Miscellaneous Civil Works	-	5.10	5.10	154.00	15.75	615.64	15.75	615.64
Floating Craft	17.50	6.80	24.30	729.00	13.83	570.86	16.42	651.00
Navigational Aids	0.50	0.15	0.65	19.00	0.44	18.98	0.48	20.54
Land Acquisition	-	0.70	0.70	20.00	4.06	148.51	4.02	148.51
Engineering and Supervision	5.10	2.25	7.35	219.00	10.65	334.18	16.80	609.36
Subtotal	108.00	48.70	156.70	4,701.00	178.17	6,504.77	185.63	6,994.52
Contingencies								
Physical Contingency	14.30	6.30	20.61	618.00				
Price Contingency	11.70	11.40	23.11	693.00				
Interest During Construction	16.15	13.40	29.55	886.00	55.46	2,351.54	55.46	2,351.54
Total B	150.15	79.80	229.97	6,898.00	233.63	8,856.31	241.09	9,346.06
Total (A+B)	**285.00**	**158.00**	**443.02**	**13,322.00**	**402.50**	**15,256.14**	**442.47**	**17,197.63**

Rs = Indian Rupees and $ = US dollars.

Note: Interest during construction is that paid by the Executing Agencies, Paradip and Chennai Port Trusts, for the funds borrowed by them for the Project.

ANNUAL AVERAGE EXCHANGE RATES AND INDIAN WHOLESALE PRICE INDEX

Year	Indian Rupee per United States Dollar	Indian Wholesale Price Index
1991	17.95	73.7
1992	24.52	83.9
1993	26.41	92.3
1994	31.36	100.0
1995	31.40	112.5
1996	33.46	121.6
1997	35.50	127.2
1998	37.16	132.8
1999	39.36	140.7
2000	43.33	145.3
2001	45.61	159.1
2002	47.53	161.3
2003	48.27	166.8

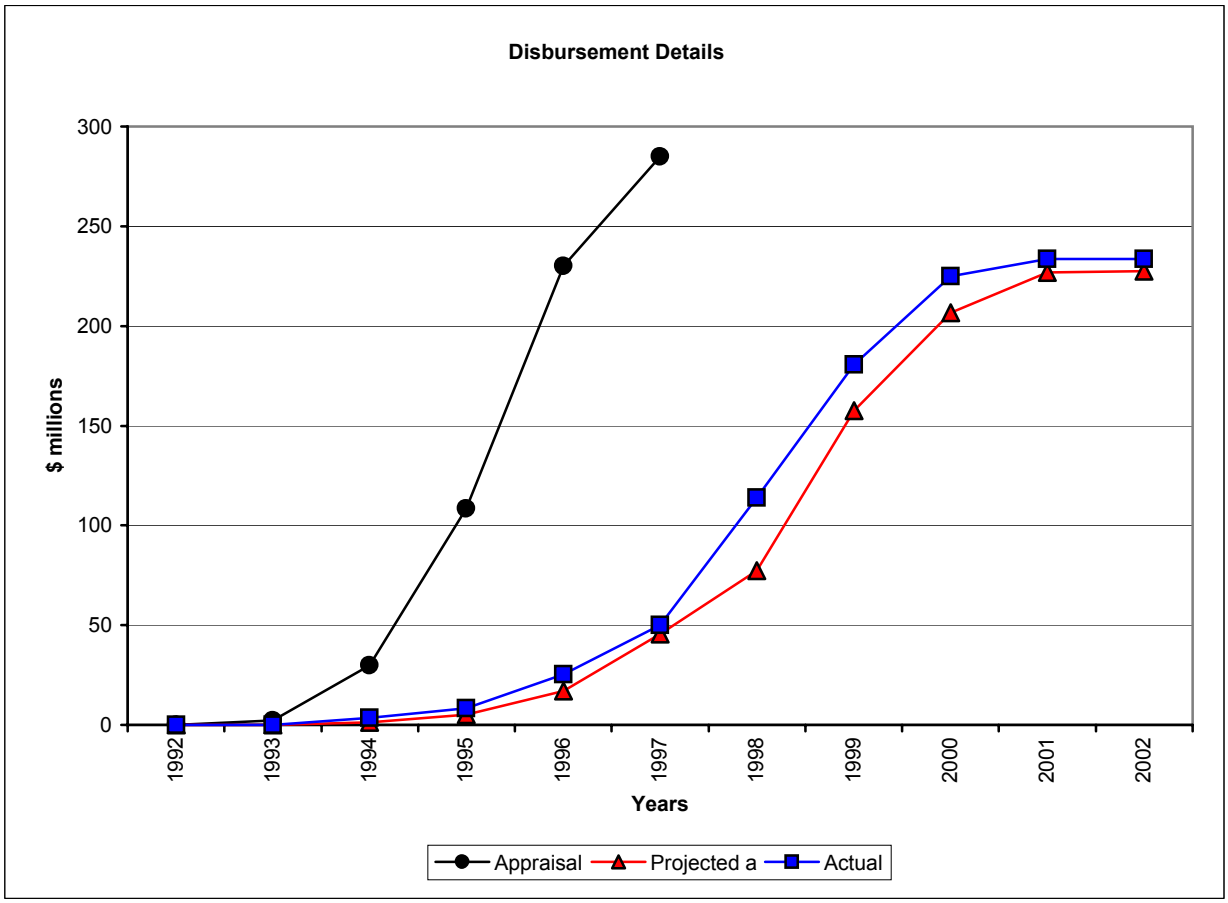
Source: Reserve Bank of India.

PROJECTED AND ACTUAL DISBURSEMENT OF LOAN PROCEEDS

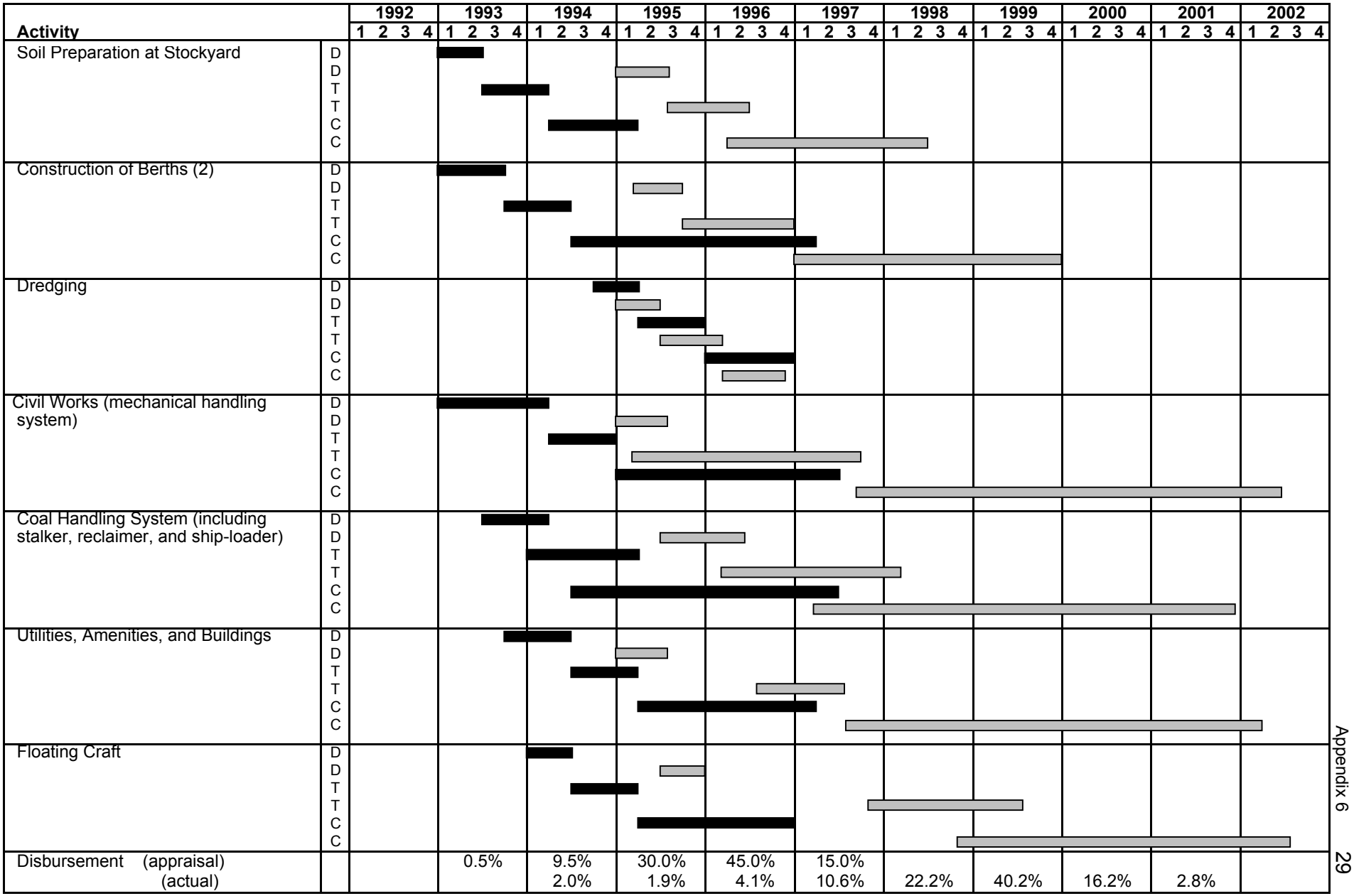
($ million)

Calendar Year	Appraisal			Projected [a]			Actual		
	For the Year	Cumu -lative	%	For the Year	Cumu -lative	%	For the Year	Cumu -lative	%
1992	-	0.000	0.0%	0.000	0.000	0.00%	0.000	0.000	0.00%
1993	2.099	2.099	0.7%	0.060	0.060	0.03%	0.108	0.108	0.05%
1994	27.749	29.849	10.5%	1.220	1.280	0.56%	3.397	3.505	1.50%
1995	78.758	108.606	38.1%	4.000	5.280	2.32%	4.925	8.430	3.61%
1996	121.508	230.114	80.7%	11.700	16.980	7.46%	16.798	25.228	10.80%
1997	54.887	285.000	100.0%	28.500	45.480	19.99%	24.977	50.205	21.50%
1998				32.000	77.480	34.06%	63.592	113.797	48.74%
1999				80.000	157.480	69.23%	66.878	180.675	77.38%
2000				49.100	206.580	90.81%	44.327	225.002	96.36%
2001				20.300	226.880	99.74%	8.427	233.429	99.97%
2002				0.600	227.480	100.00%	0.061	233.490	100.00%

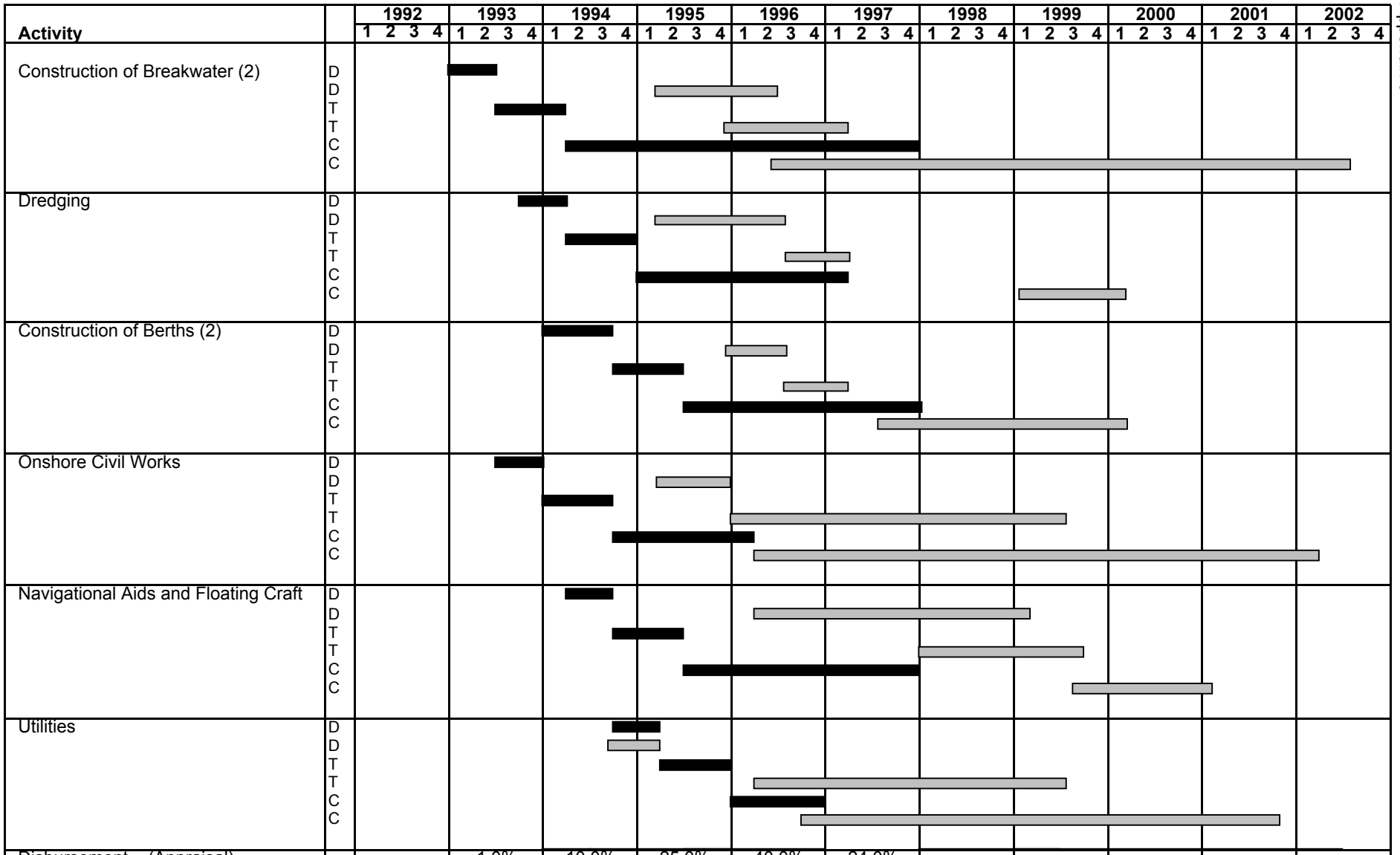
[a] Projections as made in the annual Loan Financial Information System.



PROJECT IMPLEMENTATION SCHEDULE
Paradip Port

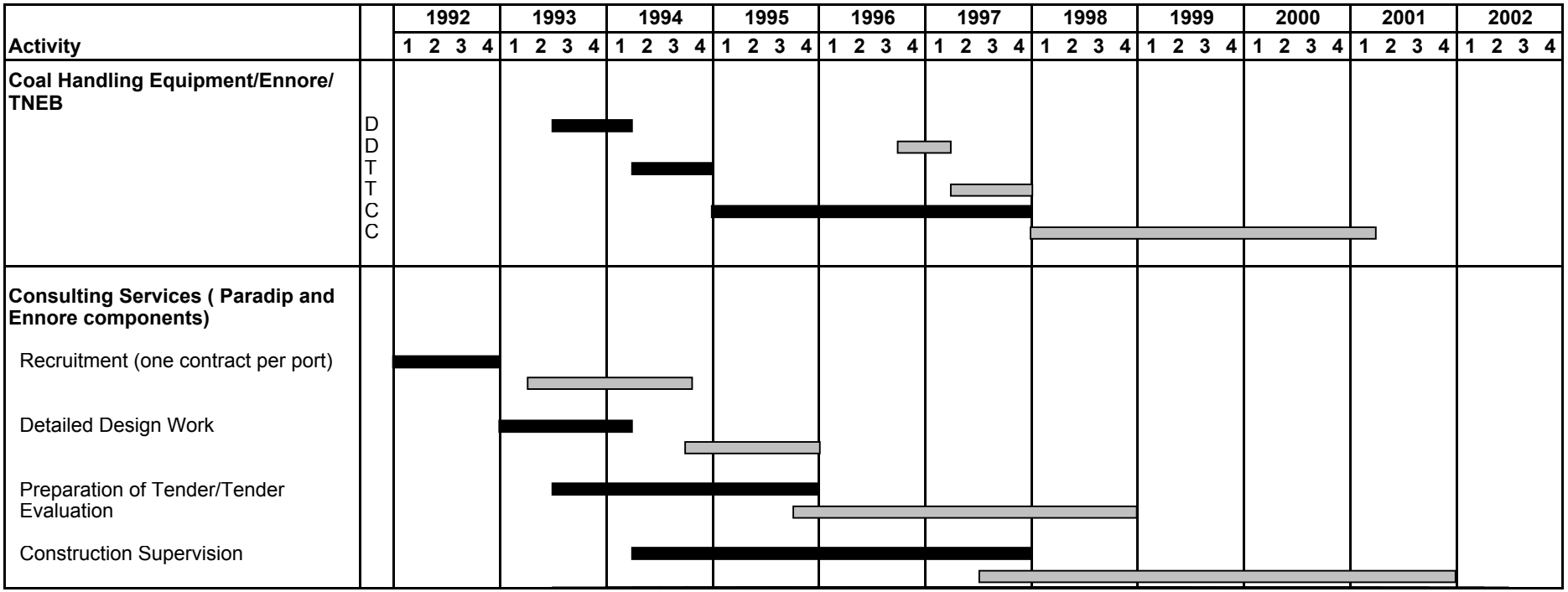


PROJECT IMPLEMENTATION SCHEDULE
Ennore Port



Note: C = Construction, D = Design and Prequalification, and T = Tendering. Plan Actual

PROJECT IMPLEMENTATION SCHEDULE
Other Activities

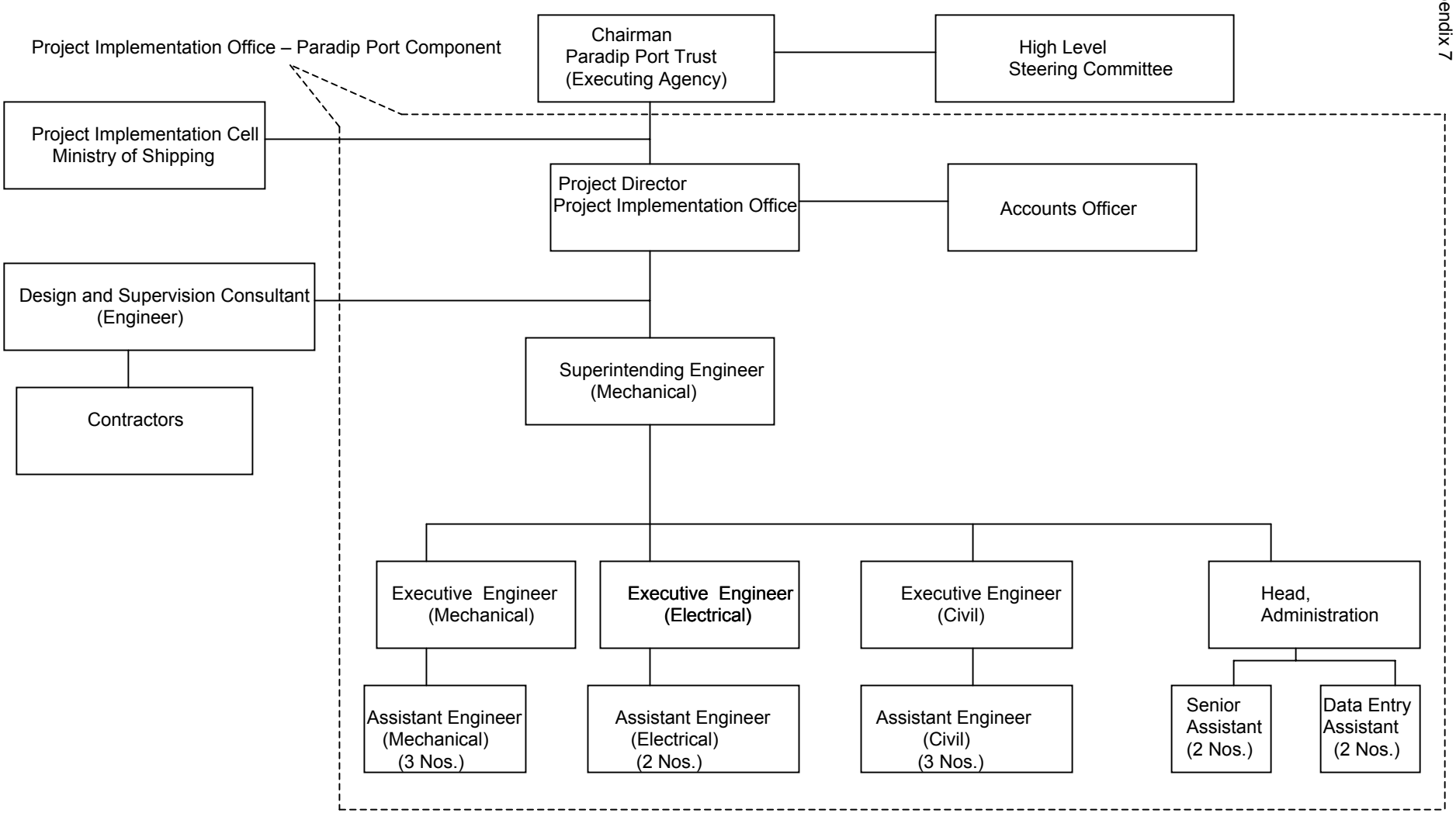


Note: C = Construction, D = Design and Prequalification, T = Tendering, and TNEB =Tamil Nadu Electricity Board.

Plan Actual

PROJECT IMPLEMENTATION STRUCTURE

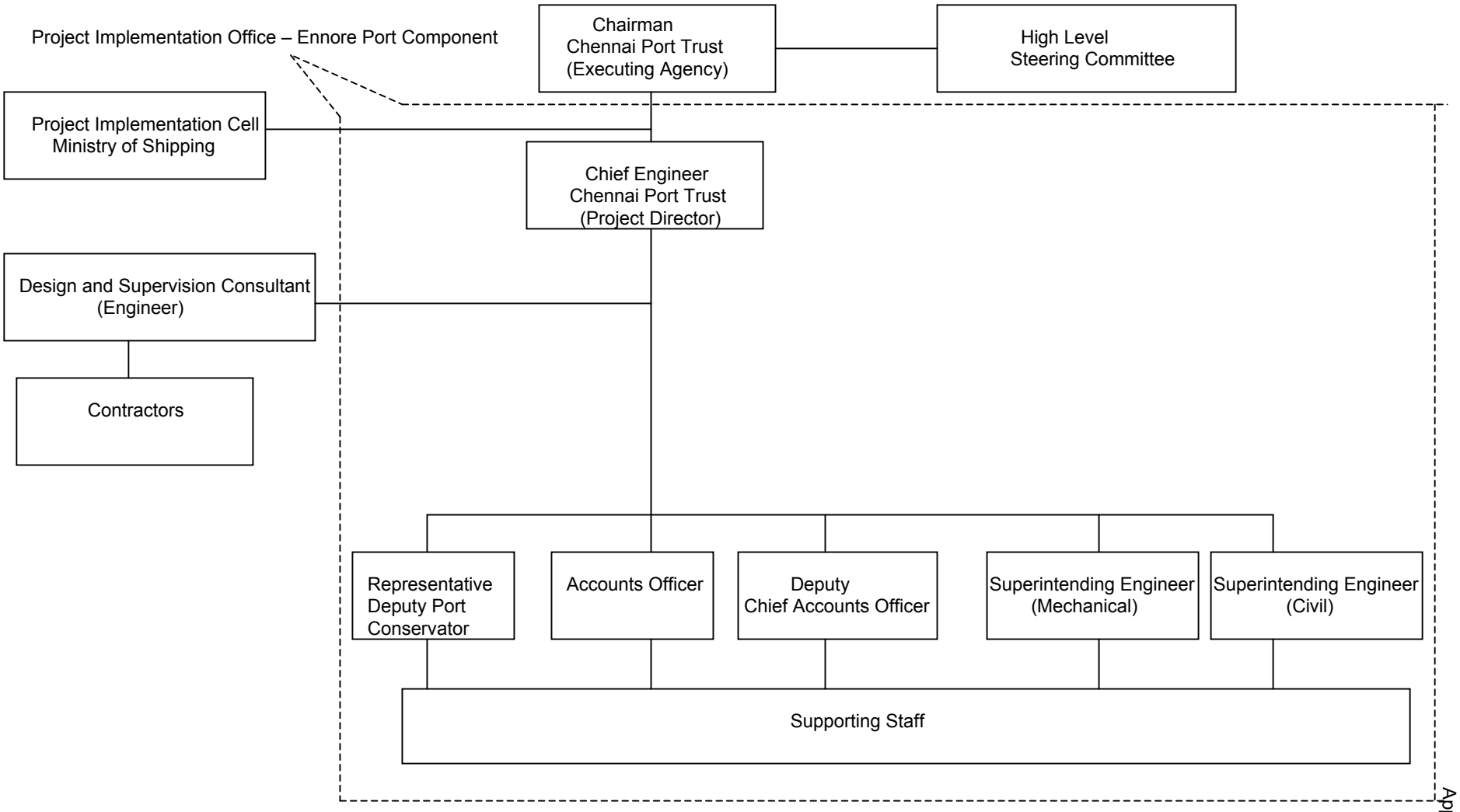
Paradip Port Component



Nos. = Numbers

PROJECT IMPLEMENTATION STRUCTURE

Ennore Port Component



STATUS OF COMPLIANCE WITH MAJOR LOAN COVENANTS

	Covenant	Reference in Loan Documents	Status of Compliance
Government of India			
1.	The Borrower is to establish a high level steering committee not later than 1 October 1992. The steering committee shall consist of representatives of all concerned agencies, including the Ministry of Surface Transport (MOST), the Ministry of Railways (MOR), the Paradip Port Trust, the Chennai Port Trust (CHPT), the Tamil Nadu Electricity Board (TNEB), and Coal India Limited, and shall be chaired by a senior representative of MOST. The steering committee shall meet at least once a quarter and shall keep the Asian Development Bank (ADB) informed of its deliberations. The steering committee shall be responsible for coordinating the activities of all concerned agencies in order to ensure that the planning and implementation of the Project and of the provision of the associated services and facilities is comprehensive and timely.	Loan Agreement (LA), Schedule 6, paras. 1–4	Partly complied with. A high level steering committee was established in March 1994, and the secretary to the Government of India of the Ministry of Shipping (MOS) was its chair. The committee held 20 meetings at intervals of 3–4 months at different sites, including the port sites. The last meeting was held at Paradip port on 21 November 2000. The minutes were sent to all concerned ministries, departments, and port trusts, including the Ministry of Programme Implementation and ADB. The committee was not successful in ensuring timely implementation of the Project and completion of the Project's components and activities to be undertaken by TNEB, Mahanadi Coalfields Limited (MCL), and Indian Railways.
2.	MOST is to establish a project implementation cell (PIC), headed by a senior official, not later than 1 October 1992. The PIC will be responsible for the overall supervision of the implementation of the Project and for coordination of project activities among the Project's Executing Agencies.	LA, Schedule 6, paras. 6–7	Complied with. A PIC, headed by a development advisor (Ports), was established in the MOS with the responsibility for overall coordination and supervision, after some delays.
3.	The Borrower shall take all necessary actions to acquire all land required for timely and successful implementation of the Project.	LA, Schedule 6, para. 8	Complied with. Land has been acquired (445 hectares [ha]) for the development at new port at Ennore. The expansion works at Paradip have been undertaken within the port area. The affected families have been relocated and rehabilitated.
4.	The Borrower shall ensure that, before completion of construction of the berths at Paradip Port and Ennore Port, satisfactory arrangements shall have been made, including the purchase or charter of additional coal-carrying ships, to ensure that adequate shipping services are provided to enable project facilities to operate at intended capacity levels and shall keep ADB informed of progress toward this end. The Borrower shall ensure that such arrangements continue to be made at all times after construction of the berths at Paradip and Ennore ports.	LA, Schedule 6, para. 10	Complied with. Poompahar Shipping Limited (PSL) is operating eight vessels in the shipping link to cater to the current coal requirements. Of these, three vessels are more than 65,000 deadweight ton (dwt) and five are in the range of 40,000 dwt to 50,000 dwt. TNEB has long-term charter lease arrangements with PSL for the transportation of coal through these vessels. PSL will be able to provide adequate shipping services, should the Project facilities operate at the intended capacities in future.

	Covenant	Reference in Loan Documents	Status of Compliance
5.	MOR is to take appropriate measures to provide an adequate number of bottom opening bottom receiving (BOBR) wagons, to ensure timely upgrading of the Talcher–Paradip rail link to meet the forecasted traffic and enable project facilities to operate at the installed capacity.	LA, Schedule 6, para. 11	Partly complied with. Indian Railways is currently providing the locomotives and wagons required for the daily delivery of 8 coal loaded rakes, with 58 BOBR wagons each, to Paradip. The upgrading of the Talcher–Paradip rail link has not yet been completed. The rail link is currently adequate to handle the present coal requirement of TNEB.
6.	The Borrower is to ensure that appropriate budget allocations are made for the timely upgrading of the Talcher–Paradip rail link, throughout the Project's implementation period.	LA, Schedule 6, para. 12	Partly complied with. The budgetary allocation made so far has not been adequate for completion of the upgrading of the Talcher–Paradip rail link.
7.	The Borrower is to ensure that an adequate supply of coal is continuously made available from the Talcher coalfields on a timely basis to enable the Project's facilities to be operated at the intended capacity levels.	LA, Schedule 6, para. 13	Complied with. MCL has augmented its production to cater to the current coal requirements.
8.	The Borrower is to ensure that Talcher coal is crushed to the required size and beneficiated, making it suitable for conveyance through mechanized coal handling systems.	LA, Schedule 6, para. 14	Not complied with. MCL has not set up facilities at Talcher for the production of sized, washed, and beneficiated coal. In 2002 oversized coal was being supplied, and in 2003 coal with high dust content is being supplied.
9.	The Borrower shall ensure that an adequate mechanical wagon loading system is provided at Talcher, to enable the Project's facilities to operate at all times at the intended capacity levels.	LA, Schedule 6, para. 15	Partly complied with. MCL is currently handling 35 million tons per annum (MTPA) of coal at Talcher, for various clients, and is using both mechanical and other means to load wagons at the mine-head.
10.	The Borrower, in consultation as necessary with TNEB, shall ensure that appropriate arrangements are made for the transport of coal from the stockyard at North Madras Thermal Power Project to each of the Ennore and Mettur Thermal power stations.	LA, Schedule 6, para. 16	Complied with. A 1,700 ton per hour (tph) mechanical wagon loader is operating at the stockyard. It is capable of loading two rakes simultaneously. Indian Railways is providing the required rakes for the movement of coal to Ennore and Mettur.
11.	The Borrower shall facilitate the implementation of recommendations made by the Paradip technical assistance (TA) consultants, under the Paradip TA, to the extent that these are agreed by the Borrower, ADB, and PPT.	LA, Schedule 6, para. 17	Partly complied with. PPT has made some progress in the implementation of the recommendations of the TA study in the areas of port management, operations, equipment management, finance, and cost accounting. However, PPT's ability to prepare medium- to long-term corporate plans remains marginal.
12.	The Borrower shall take appropriate steps to establish a separate entity to manage and operate Ennore port, independent of CHPT, and shall keep ADB informed of progress toward this end.	LA, Schedule 6, para. 21	Complied with. The Government of India corporatized Ennore Port, as Ennore Port Limited (EPL), on 11 October 1999. EPL is the first corporate port in India. It is functioning as a "landlord" port, outsourcing all port services, and has a minimum core group of port personnel.
13.	The Borrower shall, at the time of the establishment of the separate entity referred to para. 12 (above), cooperate with ADB and CHPT in amending this Loan Agreement, the Project Agreement with CHPT, and the financing arrangements and in entering into such other arrangements as may be necessary or desirable to provide that the separate entity assumes the rights and obligations of CHPT as a project Executing Agency.	LA, Schedule 6, para. 22	Complied with. At the time of corporatization, the assets and facilities developed at Ennore port, along with the liabilities, have been transferred in favor of EPL. A memorandum of understanding to that effect was signed between EPL and CHPT on 30 March 2002. The Loan Agreement and Project Agreement between ADB and CHPT were not required to be amended, as the loan closed on 31 December 2001.

	Covenant	Reference in Loan Documents	Status of Compliance
Paradip Port Trust			
14.	PPT is to establish a project implementation office (PIO) not later than 1 December 1992. The PIO is to be headed by a full-time project director, who shall be assisted by an adequate number of suitably qualified, full-time professional and technical staff. The PIO will be responsible for day-to-day project implementation activities.	Project Agreement (PA), Schedule, para. 2	Complied with. The PIO was established, after some initial delays, with a project director and an adequate number of qualified staff. The personnel at the project site assumed full responsibility for day-to-day activities during the Project's implementation period. The unit is currently operating and will supervise the operation activities until the coal handling facilities are handed over to a private sector operator.
15.	Project Benefit Monitoring and Evaluation (PBME): PPT to select, in consultation with ADB, performance indicators and efficiency targets to monitor project benefits.	PA, Schedule, para. 3	Delayed compliance. Report on PBME received by ADB in October 2000.
16.	PPT to take appropriate measures to produce funds from its internal resources. The amount should be (i) not less than 10% of PPT's annual capital expenditures incurred for each fiscal year from FY1994 to FY1996 and (ii) not less than 20% for each fiscal year from FY1997.	PA, Schedule, para. 4	Complied with. The ratio of funds generated to annual capital expenditure for FY2000 to FY2002 was 33%, 50%, and 21%, respectively.
17.	PPT is to earn for each of its fiscal years after its fiscal year ending on 31 March 1993, an annual return of not less than 10% of the average current net value of PPT's fixed assets in operation.	PA, Schedule, para. 6(a)	Complied with. The ratio of annual return to the fixed assets in operation for FY2000 to FY2002 was 31%, 49%, and 15%, respectively. These ratios were, however, based on the historic value of net fixed assets and not on reassessed value.
18.	PPT, by using its own resources, is to engage consultants not later than 31 December 1992, to assist in the evaluation of its fixed assets.	PA, Schedule, para. 8	Delayed compliance. Consultants for evaluation of fixed assets were appointed in February 2001, and the report was completed in May 2002.
19.	PPT is to revalue its fixed assets not later than 31 March 1993 and thereafter revalue its fixed assets at least once every 5 years. PPT shall promptly inform ADB of the outcome of each revaluation of its assets.	PA, Schedule, para. 9	Not complied with. The fixed assets were evaluated for the first time in 2002.
20.	PPT is to ensure that the amount of its accounts receivable at no time exceeds the amount of its billing for last three months.	PA, Schedule, para. 10	Complied with. PPT has sundry debts of Rs516.2 million, as of 31 March 2002, against its billing for last three months of Rs711.2 million.
21.	PPT has to adopt a crisis management plan to deal with environmental disasters arising from the handling of coal while using project facilities.	PA, Schedule, para. 11	Complied with. PPT integrated into the port disaster management plan, in 2002, the management plan for dealing with crises emanating from project facilities.
22.	PPT is to furnish to ADB promptly after their preparation, but not later than 9 months after the close of the fiscal year, the certified copies of the audited accounts for the related year.	PA, Schedule, para. 2.09	Delayed compliance.

	Covenant	Reference in Loan Documents	Status of Compliance
Chennai Port Trust			
23.	CHPT is to ensure that a PIO is established not later than 1 December 1992. The PIO is to be headed by a full-time project director, who shall be assisted by an adequate number of suitably qualified, full-time profession and technical staff. The PIO will be responsible for day-to-day project implementation activities.	PA, Schedule, para. 2	Complied with. A PIO was established, after some initial delays, with the CHPT chief engineer as the project director and adequate number of qualified staff.
24.	PBME: CHPT is to select, in consultation with ADB, performance indicators and efficiency targets to monitor project benefits.	PA, Schedule, para. 3	Delayed compliance. Final report submitted on 30 May 2000.
25.	CHPT is to take appropriate measures to produce funds from its internal resources. The amount should be (i) not less than 10% of CHPT's annual capital expenditures incurred for each fiscal year from FY1995 to FY1997 and (ii) not less than 20% for each fiscal year from FY1997.	PA, Schedule, para. 4	Complied with. The ratio of funds generated to annual capital expenditure for FY1995 to FY2002 was 388%, 231%, 135%, 129%, 68%, 53%, 50%, and 44%, respectively.
26.	CHPT is to earn for each of its fiscal years after its fiscal year ending on 31 March 1993, an annual return of not less than 10% of the average current net value of CHPT's fixed assets in operation.	PA, Schedule, para. 5	Complied with. The ratio of annual return to the fixed assets (historic value) in operation for FY1994 to FY2002 was 48.8%, 43.2%, 45.3%, 37%, 35.7%, 26.5%, 16%, 14%, and 45%, respectively.
27.	CHPT, by using it own resources, is to engage consultants not later than 31 December 1992, to assist in the evaluation of its fixed assets.	PA, Schedule, para. 7	Delayed compliance. Consultants for evaluation of fixed assets were appointed only in 1999, and the report was completed in June 1999.
28.	CHPT is to revalue its fixed assets not later than 31 March 1993 and thereafter revalue its fixed assets at least once every 5 years. CHPT shall promptly inform ADB of the outcome of each revaluation of its assets.	PA, Schedule, para. 8	Not complied with. The fixed assets were evaluated in 1999 for the first time.
29.	CHPT is to ensure that the amount of its accounts receivable at no time exceeds the amount of its billing for last three months.	PA, Schedule, para. 9	Complied with. Sundry debts were lower than the billing for last three months.
30.	CHPT is to adopt a crisis management plan to deal with environmental disasters arising form the handling of coal while using project facilities.	PA, Schedule, para. 10	Complied with. The coal handling operations at Ennore are being undertaken by TNEB. EPL, for its part, prepared and adopted in 2002 a crisis management plan for dealing with such an eventuality within the port area.
31.	CHPT is to acquire the land required for the development of Ennore port not later than 1 April 1993.	PA, Schedule, para. 11	Delayed compliance. A total land area of 445 ha was acquired during 1994 and 1995, for the development of a new port at Ennore.
32.	CHPT shall submit its audited accounts within 9 months after the close of the fiscal year.	PA, Schedule, para. 2.09(a)	Delayed compliance.

	Covenant	Reference in Loan Documents	Status of Compliance
33.	CHPT is to establish new tariffs for its operations at Ennore port. CHPT is to design such tariffs in order to recover, for each of its fiscal years commencing after the start of coal handling operations at Ennore port, its total operating expenses at the port and also an annual rate of return of 4% on net revalued fixed assets in coal handling operations. For these purposes, total operating expenses at Ennore port, the rate of return and the method of valuing fixed assets in operation at Ennore port shall be calculated on a basis acceptable to ADB. Such revaluations shall be carried out every 5 years from the start of coal handling operations.	PA, Schedule, para. 12	Complied with. EPL and TNEB have negotiated a composite tariff of Rs90 per ton for the handling of thermal coal for TNEB at coal berths I and II. This tariff was not subjected to Tariff Authority for Major Ports regulations and was based on cost-recovery principles and market forces. The valuation of fixed assets of EPL is based on project costs on the date of incorporation. The reevaluated financial internal rate of return for the Ennore component of the Project is more than 4%.
34.	CHPT shall, from the start of operations at Ennore port, maintain separate accounts for Ennore port.	PA, Schedule, para. 13	Partly complied with. Separate accounts for development works at Ennore were maintained by CHPT for only 3 years: FY1999, FY2000, and FY2001.

TECHNICAL ASSISTANCE COMPLETION REPORT FOR TA NO. 1770-IND

Division: India Resident Mission (INRM)

<table>
<tr><td colspan="3">TA No., Country and Name:
TA 1770-IND: Planning and Management Advisory Services for Paradip Port Trust</td><td colspan="2">Amount Approved: $ 600,000</td></tr>
<tr><td>Executing Agency:
Paradip Port Trust</td><td colspan="2">Source of Funding:
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<tr><td>Approval:
27 Oct 1992</td><td>Signing:
25 Aug 1998</td><td>Fielding of Consultants:
11 Jan 1999</td><td>Original:
31 May 2000</td><td>Actual:
31 Sep 2000</td></tr>
</table>

Description

1. Paradip Port is a designated “major port” under the administrative control of the Ministry of Shipping (MOS), Government of India and is managed by Paradip Port Trust (PPT), which was formed in 1967. The port, originally planned for the export of iron ore produced in the state of Orissa, gradually expanded its operations to thermal and coking coal, petroleum, oil, and lubricants (POL), fertilizer raw material, and other bulk and general cargo. Before commissioning the mechanized coal handling system, lower quantities of coal were being handled at the port, largely by employing semimechanized and manual methods.

2. In 1992, the Asian Development Bank (ADB) approved Loan No. 1181-IND for the implementation of the Coal Ports Project. A component of the Project was the expansion of Paradip port for coal handling using a fully mechanized high capacity (20 million tons per annum) thermal coal handling plant (mechanized coal handling plant [MCHP]). The rationale for the advisory technical assistance (TA) was to assist PPT in improving its operational, financial, engineering, planning, and management capabilities and prepare PPT to operate a fully automated MCHP facility, after its commissioning.

Objectives and Scope

3. The fundamental objectives of the TA for Planning and Management Advisory Services to Paradip Port Trust were to (i) improve PPT's engineering and financial capabilities and its ability to prepare corporate plans; (ii) assist PPT management to improve its bulk material handling operations; (iii) train the operational personnel in carrying out adequate preventive maintenance of the new coal handling equipment; and (iv) achieve improved, efficient, and effective port performance.

4. The scope of the advisory study encompassed

A. Operations Management

(i) system design and training for computer-based preventive maintenance of the plant, contingency action plans, pollution control, and spare parts management; and
(ii) management of all port operations, including wagon movements, setting up of performance indicators for equipment, collection of ship data for daily loading of vessels, and establishment of a periodic monitoring system.

B. Financial Management

(i) establishment of a simplified and functional tariff encouraging financial and operational efficiency;
(ii) review and improvement of the existing computer information system; and development of a financial action plan to reduce costs and ensure compliance with financial covenants of ADB and government financial objectives for PPT.

C. Corporate Planning

(i) assist in defining the extent of involvement of PPT in nonport-related activities;
(ii) identify the areas of port operations suitable for private sector participation, as contemplated by the Government of India; and
(iii) prepare short- and medium-term action plans over 5 years and a long-term action plan over 10 to 15 years

Evaluation of Inputs

5. The TA was to be implemented over a period of about 8 months by a team of international and domestic consultants. The total input of consultants was estimated at 34 person-months, consisting of 22 person-months of internationally recruited experts and about 12 person-months of domestic experts. A German consulting firm, Port and Transport Consulting Bremen along with their Indian associates Consulting Engineering Services (India) Limited were selected as the consultants for the TA. The terms of reference for the consultants were well formulated and adequate. The consultants carried out their assignments in accordance with the terms of reference and made recommendations encompassing the scope of the TA. The assignment was carried out in two phases. Phase 1 –consisted of fact-finding, analysis and diagnosis, recommendations for immediate actions, and outlining medium- and long-term measures. Phase 2 –consisted of detailed recommendations, action plans, and medium- and long-term corporate plans. The final report was submitted on time.

6. Active involvement and inputs from PPT management was achieved through setting up 10 working groups, each comprising senior managers, mostly department heads, and other functionaries bringing in multidisciplinary views and interests to tackle defined tasks, even after the completion of the consultants' input.

7. This model was successfully implemented with the support of the top management, and improvements were achieved as the working groups evolved into cohesive units of departmental heads preparing action plans under the overall guidance of the PPT chair and the management services group.

Evaluation of Outputs

8. The consultants commenced work on 4 January 1999 and visited New Delhi and the Paradip project site from 11 January 1999. They submitted an inception report in February 1999; an interim report in May 1999; and a final report in February 2000, comprising Volume 1: Executive Summary, Volume 2: Port Management, Port Operations, and Pollution Control, Volume 3: Equipment Management, and Volume 4: Finance Accounting, Cost Accounting, Tariffs, Computerization, Short-Term Action Plan, Medium-Term Action Plan, and Outline of a Long-Term Action Plan.

9. The consultants carried out exhaustive work for institution building and training requirements for PPT. Studies, analyses, and recommendations were made on aspects of port management, port operations, pollution control, equipment management, finance accounting, cost accounting, tariffs, computerization, a short-term action plan, a medium-term corporate plan, and an outline of a long-term corporate plan.

10. The consultants recommended incorporation of human resources development into a central personnel division, which would be a focal point of PPT. The division would record job descriptions and initiate reduction in the hierarchical levels to three, to streamline and speed up the decision-making process. PPT has since received ISO 9000 certification and has incorporated the recommendations.

11. In order to optimize port operations, PPT has refined and implemented cargo handling performance and productivity improvement plans. Investment and replacement plans for equipment, risk and safety audits, and quality plans have been implemented. No significant progress has been made with regard to the development of an integrated management information system or the training of workers.

12. The operation of the MCHP is being privatized, in line with recommendations. A tender document for operations and maintenance of the facilities has been floated among four short-listed firms, and it is expected that the selected bidder would take over operation in January 2004.

13. An environmental management cell has been set up, and it has prepared an emergency response and disaster management plan. Reception facilities for slop oil and ballast water and a comprehensive oil spill contingency plan are in place.

14. A computerized system for finance accounting has been developed and implemented selectively. It functions as a stand-alone system within the finance department. PPT revalued the fixed assets as of 31 March 2002, to comply with the financial covenants and estimate current replacement costs and assess modernization costs. No progress has been achieved in the subdivision of the port organization into meaningful profit and cost centers and the implementation of operational time sheets and electronic data processing.

15. Tariff rates in line with the recommendations in a slab rate structure have been implemented for MCHP facilities following the approval of the Tariff Authority for Major Ports (TAMP).

16. The consultants prepared short-, medium- and long-term action plans to enable the PPT to prepare corporate plans for its operation.

Overall Assessment and Rating

17. The TA has been generally successful in fulfilling the tasks set out, and some of its recommendations are being implemented by PPT.

18. PPT has taken advantage of the TA study and implemented some of the recommendations in the areas of computerization in finance, material management payroll, estate management, monitoring operations and controls of MCHP facilities, pollution control and dust suppression arrangements in various sections of MCHP facilities, and privatization of MCHP operations. A new tariff structure for handling coal through the MCHP has been fixed (vide TAMP Gazette of India notification no. 323 [3 December 2001]).

19. PPT management is now oriented toward private participation on a build-operate-transfer route for the second mechanized iron ore handling plant and oil jetty. However, PPT's ability to prepare medium- to long-term corporate plans remains marginal.

Major Lessons Learned

20. The scope of the TA study was very wide, and the difficulties in implementation arising due to the generic nature of the recommendations were apparent. A curtailed and more focused scope would have been effective in producing measurable milestones for assessment of progress. Some of the recommendations made on port management, finance, and cost accounting and corporate plans have far-reaching influence on the Government's policies and plans and may not be easy to implement by the port trust, as it is a government institution.

Follow-up Actions and Recommendations

21. PPT's progress in the implementation of the recommendations of the TA study in the areas of port management, port operations, equipment management, and finance and cost accounting are marginal. These need follow-up measures to achieve optimization. PPT's ability to produce corporate plans needs to be strengthened through the addition of more professional and experienced staff.

TECHNICAL ASSISTANCE COMPLETION REPORT FOR TA NO. 1771-IND

Division: India Resident Mission (INRM)

<table>
<tr><td colspan="3">TA No., Country and Name:
TA 1771-IND: Policy Reforms in Indian Ports and Shipping Sector</td><td colspan="2">Amount Approved: $670,000</td></tr>
<tr><td>Executing Agency:
Ministry of Surface Transport (MOST), Government of India</td><td colspan="2">Source of Funding:
ADB</td><td>Amount Undisbursed:
$35,323</td><td>TA Amount Utilized:
$634,677</td></tr>
<tr><td colspan="3">Date</td><td colspan="2">Closing Date</td></tr>
<tr><td>Approval:
27 Oct 1992</td><td>Signing:
14 Jun 1993</td><td>Fielding of Consultants:
21 Jun 1993</td><td>Original:
18 Jul 1994</td><td>Actual:
19 Jul 1994</td></tr>
</table>

Description

1. The Government of India, in its eighth 5-year plan, set out a policy to limit public investments and encourage private initiative in the provision and operation of infrastructure, including ports, and restrict its control to a regulatory role. Implementation of this policy translated into a shift toward the ”Landlord” concept for ports management, with major activities for the provision of facilities and operation being undertaken by agencies outside the port trusts. The Ministry of Shipping (MOS), in its sector plan document on ports, also subscribed to the idea of involving the principal users in further development and operation of port facilities and reducing its own financial involvement.

2. In support of this policy, the Asian Development Bank (ADB) provided this technical assistance (TA) grant, in conjunction with a loan for the Coal Ports Project, to assist MOS in the further development and implementation of its policy reforms in the ports and shipping sector.

Objectives and Scope

3. The primary objective of the TA was to formulate a broad-based strategy for privatization in the ports and shipping sector. It was envisaged to study the existing system of port management and organization in the major ports, as well as methods of cargo handling, and identify potential areas/activities for privatization of port operations/services through appropriate reforms in the areas of labor, institution, management and organization, and procedures. An associate aim of the TA was to develop measures for achieving the goals of improved capacity, operational efficiency, and productivity that would respond to user requirements in 21st century and reduce public funding.

4. Consistent with its national importance, the Indian ports and shipping sector has been the subject of studies by many authorities and reform committees since 1986, which include the World Bank’s *India Port Sector Strategy Report*, 1993; ADB’s *Ports and Shipping Sector Study*, 1990; and two reports of the Major Ports Reform Committee (MPRC), 1986 and 1987. A majority of MPRC recommendations had been endorsed by MOS, in principle. Nevertheless, several similar recommendations were reported in the later reports of 1990 and 1993. While MOS acknowledged the wisdom of the recommendations, implementation had been lagging some distance behind the recognition. This TA was yet another attempt to help MOS speed up necessary policy reforms.

5. The scope of the consultant’s work was to develop measures for transforming and improving the management of the Indian port sector to support industrial and economic development in India while covering specific ports and shipping sector aspects, which include the following:

A. Ports

(i) identification of means to improve productivity and efficiency through reforms of labor practices and laws, revamp of operational practices, encouragement of private sector participation;
(ii) identification of the need to review the Government's role with respect to delegation of power, autonomy and accountability of port trusts, changes to the Indian Ports Act, 1908, and Major Port Trusts Act, 1963; and
(iii) identification of regulatory measures and safeguards to foster competition and maximize benefits to the end users.

B. Coastal Shipping

(i) identify the potential of coastal shipping and privately owned/operated facilities at minor port locations that could promote coastal cargo transportation; and
(ii) review earlier studies and suggestions and the status of implementation, prioritize outstanding issues, and make appropriate recommendations to move forward.

Evaluation of Inputs

6. The TA was to be implemented over a period of about 7.5 months by a team of international and domestic consultants. The total input of consultants was estimated at 37 person-months, consisting of 25 person-months of internationally recruited experts in the fields of port management/organization, operations, investment financing/privatization, planning, equipment maintenance, and shipping and about 12 person-months of domestic experts. TechEcon, a consulting firm from the United Kingdom; MSD Consultants, Singapore; Danport, Denmark; and Consulting Engineering Services, India were selected as the consultants for the TA. The consultants carried out their assignments in accordance with the terms of reference and made recommendations encompassing the scope of the TA.

7. The consultants built upon earlier reports, rather than duplicating/repeating earlier works, and directed efforts towards the issues upon which progress was being held up due to bureaucracy at the center, inertia among port management and users, labor obstruction, and customs hindrance to trade. Their approach was comprehensive, integrated, and professional, and their performance in carrying out the assignment was methodical and good. The final report was submitted on time.

Evaluation of Outputs

8. The consultants submitted an Inception Report (Stage I: Diagnostic Overview) in August 1993, an Interim Report (Stage II: Opportunities and Constraints) in December 1993, and a Draft Final Report (Stage III: Strategy Program and Action Plan) in March 1994.The Inception Report and the recommendations of the Draft Final Report were discussed in seminars held in New Delhi with the representatives of MOS, ADB, port trusts and concerned government authorities. The Final Report was submitted in June 1994, integrating previous documents submitted and the issues raised in the seminar and written comments.

9. The consultants recommended the corporatization of two ports, which would serve as examples. The intention of the Government to proceed toward commercialization of major ports, increasingly playing the role of "Landlords," and privatization of a majority of port operations was identified. MOS, however, opined that the stage was not yet set for corporatization or extensive privatization. As a result, after the Interim Report, the consultants concentrated on aspects dealing with commercialization and improvement of the autonomy of the port managers as the immediate measures to pursue in the report

10. Taking cognizance of the consultants' recommendations, the Government embarked on an initiative directed towards port privatization/corporatization. Key areas were identified by the Government for private sector participation in major ports and necessary guidelines were issued to various ports concerning the procedures to be followed for inviting private investors.

11. These key areas included leasing out existing assets; constructing and operating liquid bulk, break bulk, multipurpose, or specialized cargo berths; constructing and operating container terminals, warehouses, container freight stations, storage facilities, and tank farms; supply, maintenance, and operation of cranes and handling equipment, dry dock and ship repairing facilities, dredging equipment, captive power plants, and captive facilities for port-based industries; and leasing of floating craft.

12. Policy guidelines enabling the above were issued in 1996. In 1997, guidelines enabling major ports to set up joint ventures with foreign ports, minor ports, or private companies were issued. The Tariff Authority for Major Ports (TAMP) was set up in March 1997, to fix and revise tariffs at major ports. The Major Port Trusts Act, 1963, was amended to effect these guidelines.

13. The consultants noted that coastal shipping had lost its traditional general cargo movement role and was focused on clinker/cement and heavy bulks such as oil, coal, and iron ore. Almost all the coastal cargo carried was captive industrial cargo, for single users, and handled at dedicated berths. This trend was in line with that around the world. The revival in port traffic and investment was skewed in favor of Gujarat, mainly due to the state government's policy of encouraging private sector investment. Even today the trend remains unchanged, with other maritime state governments lacking interest in similar policies.

14. In August 2002, MOS invited two proposals from consultants. The first was to study the possibility of having a centralized single entity for the regulation of coastal shipping that could develop and recommend necessary restructuring and policy and reform measures. The second was to study the traffic mix and coastal routes and recommend a development strategy.

15. Although there is no legislation currently in force for the corporatization of Indian ports, Ennore port has been corporatized as Ennore Port Limited (EPL). Studies for corporatization of ports have been undertaken for New Mangalore port and Mormugao port; however, revaluation of assets for these ports has not yet been done. Jawaharlal Lal Nehru port and Haldia Dock Complex are the two other ports identified for corporatization. The revaluation of assets of Jawahar Lal Nehru port has been completed and the revaluation of assets of Haldia Dock Complex is being carried out. No corporatization of these ports seems possible without legislation.

16. Legislative changes to the Major Port Trusts Act, 1963; Customs Act, 1962; and Dock Workers Act, 1948 were indicated by the consultants. A step-by-step transition toward privatization or decentralization, which are important steps toward the "Landlord" concept, was suggested as the way to proceed. Recommendations for new legislation (Ports Policy Reforms Act) with revision of the Major Port Trusts Act, 1963, in due course, to reflect the changed role of the Government and port management, are being implemented.

Overall Assessment and Ratings

17. The consultants have comprehensively dealt with recommendations for new legislation; guidelines for private participation, prefeasibility assessment, autonomy, planning, and budgeting; tariffs; seconding port officials to MOS; a port chair and a proposed chief executive officer/general manager; succession planning; contracting, labor, and strategic management reviews; and action plans for ports and MOS, to be taken within 1 year and subsequently in the midterm.

18. The TA has been generally successful in fulfilling the tasks set out and its recommendations are broadly being implemented by the Government through (i) issue of guidelines for private sector participation; (ii) delegation of some authority to major port trusts; (iii) creation of TAMP; (iv) declaration of policy for corporatization of JNPT and Haldia Dock Complex; and (v) amendments to Major Port Trusts Act, 1963.

Major Lessons Learned

19. Present legislation relating to ports—The Ports Act, 1908 and The Major Port Trusts Act, 1963—are found to be archaic, outdated, and irrelevant in the context of a modern liberalized regime. Instead of tinkering with present legislation to meet arising needs in a piecemeal way, these acts need to be superseded by a new port act, applicable to any Indian port regardless of ownership—major, minor, private, or captive. Rather than dealing with commercial, operational, and day-to-day functional aspects, the new act needs to focus on regulatory mechanisms.

Recommendations

20. Legislative changes enabling the privatization initiative and follow-up are the current needs.

POWER SECTOR SCENARIO

1. India has a total installed capacity of 104,918 MW, as of March 2002. The state electricity boards (SEBs) account for 60% of this capacity, the central utilities contribute 30%, and the private sector accounts for the remaining 10%. About 70% of the installed base is thermal. Hydro constitutes 25%, the rest being nuclear, renewable, and other sources. The overall capacity addition in the last decade has been about 2,400–4,400 MW per annum. Due to a paucity of funds, SEBs have not been adding much capacity. Capacity use also continues to be low.

2. In 1991, when liberalization began, power was one of the sectors that urgently needed reforms and privatization. The capacity gap was enormous, and it was not possible for the Government to bridge the gap. Hence, it was decide to encourage private sector participation in generation. However, in the last decade, not much of power-generation capacity has been added up in the private sector. Even counter-guaranteed projects have faced problems in achieving financial closure. This has largely been due to the lack of an adequate payment security mechanism and poor health of SEBs. The status in Tamil Nadu has also been similar.

3. The total installed capacity for power generation available to Tamil Nadu Electricity Board (TNEB) in the year 1992 was 6,019 MW, from which 21,920 million units of power were generated. Although the total installed capacity for power generation available to TNEB rose to 7,513 MW in the year 2001, an increase of 25%, the power generated during the year was 41,764 million units, an increase of 90%. This was possible due to increased efficiencies and an improved plant load factor.

4. At appraisal, the installed capacity of thermal power plants owned by TNEB was 1,710 MW. The installed capacity was expected to increase to 4,470 MW by the year 2001, through the installation of (i) 3x210 MW at Tuticorin Thermal Power Station (TTPS); (ii) 3x210 MW (stage 1) at North Chennai Thermal Power Station (NCTPS); (iii) 2x500 MW (stage 2) at NCTPS; and (iv) 1x500 MW (stage 3) at NCPTS. The installed capacities that TNEB has actually been able to install have been those at (i) and (ii) above. With the Government's initiatives to enhance private sector participation in power generation, TNEB signed concessions with the private sector for the setting up of an additional 1,500 MW of generation capacity at NCPTS, which was substantially delayed, given that the plants were to start generation by 2001. The concessionaires were to achieve financial closure by March 1999 and set up the generating capacities by 2003. However, the concessionaires were not able to achieve financial closure, as the environment for private sector participation in power generation is still poor in India. The poor financial position of SEBs discourages the funding of private sector power projects. The total capacity installed by the private sector up to the year 2001 in Tamil Nadu has been only 301.66 MW. This resulted in the eventual cancellation of the concessions granted to the private sector. TNEB has now signed a memorandum of understanding (MOU) with the National Thermal Power Corporation (NTPC) for the generation of 1,000 MW at NMPTS, which is expected to be fully commissioned by 2008.

5. NTPC has recently commissioned a power plant with a capacity of 1,500 MW at Talcher for the supply of power to the energy-deficient southern states through the Talcher–Kolar transmission lines commissioned by Power Grid Corporation of India. This capacity is further targeted to be enhanced to 3,000 MW by the year 2006. This is one of the longest transmission lines set up for transmission of power in India.

6. Although there has been a marked improvement in the energy produced, even with limited augmentation in the power generation capacities, Tamil Nadu still faces power shortages and resultant load shedding. The peak power and energy shortages for FY2002 were 13.1% and 7.1%, respectively. Also, the demand for power is expected to increase at a rate of 8% per annum. The state of Tamil Nadu awarded projects to the private sector for the installation of an additional capacity in excess of 7,500 MW, including 1,500 MW at NCPTS, which eventually got cancelled. Of this, 3,500 MW is based on either gas or diesel as a raw material. Out of a total capacity of 4,140 MW from the central generating stations, including that from NTPC, the share for Tamil Nadu is 1,219 MW.

7. Due to the inability of TNEB to increase the power-generation capacity to 4,470 MW at the plants owned by them, the requirement of TNEB for thermal coal at Ennore Port has fallen from the appraisal estimate of 14.20 MTPA to about 8.4 MTPA in FY2003. Similarly, the requirement of coal by TNEB for thermal coal to be shipped from Paradip port has fallen from the appraisal estimate from 16.1 MTPA to about 7.7 MTPA in FY2003. This has lead to gross underutilization of project facilities.

8. Given the demand and supply gap, there is still optimism that the additional generation capacities, which were expected to be commissioned by TNEB at appraisal, can even now expected to be fully in place by 2008, to enable nearly full-capacity utilization of the Project's facilities.

CARGO TRAFFIC AT PARADIP AND ENNORE PORTS

1. The Project's facilities developed at Paradip and Ennore are captive in nature. They essentially target the coal requirement for the thermal power plants of Tamil Nadu Electricity Board (TNEB) at Ennore, North Chennai, Mettur, and Tuticorin. The basic coal consumption rate for electricity generation at these plants, averaged over the past 5 years, was about 1.0 kilogram per kilowatt hour (kg/kWh) , 0.74 kg/kWh, 0.79 kg/kWh, and 0.68 kg/kWh for Indian coal with about 40% ash content. Future expansion of power-generation capacities at North Chennai may consume coal at 0.76 kg/kWh. A typical 500 megawatt (MW) power unit would require about 2.35 million tons per annum (MTPA) of coal. There may, however, be variations, depending on the load factor and general efficiency of the boiler.

2. The augmentation of generation capacities through private sector participation did not materialize. Consequently, TNEB has entered into a memorandum of understanding (MOU) with NTPC for expansion of power-generation capacities at North Chennai in two phases that would add 500 MW by 2006 and an additional 500 MW by 2008. The power-generation capacities at the four TNEB plants by 2008 would thus be 450 MW, 1630 MW, 840 MW, and 1050 MW, respectively. The entire coal requirement for Tuticorin plant is expected to shift from Vishakhapatnam to Paradip by 2004.

3. PPT plans to use the available capacity of the Project's facilities to increase the export of iron ore from Paradip port. Iron ore is currently being loaded from a berth adjacent to the Project's coal berths. Targets of achieving additional export of 2.0 MTPA by 2005 and 4.0 MTPA by 2008 are considered feasible. The erstwhile coal shipments for the thermal plants through Chennai port have already shifted to Ennore and iron ore currently handled at Chennai is also planned to be shifted to Ennore. EPL is planning to use the harbor area created and targets port expansion on a build-own-operate-transfer basis. Over the next 5 years, there are plans to develop two coal berths, one iron ore berth, one liquefied natural gas berth, two products and oil lubricants/liquid chemicals berths, and one crude berth. Targets of handling additional cargo of iron ore at 5.0 MTPA by 2005; petroleum, oil, and lubricants (POL) at 2.0 MTPA and 5.0 MTPA by 2005 and 2006; and 3.0 MTPA and 5.0 MTPA of other coal by 2005 and 2008 have been considered. These aspects are reflected in the Tables A12.1 and A12.2.

Table A12.1: Cargo Traffic at Paradip (MTPA)

Fiscal Year	Appraisal					PCR						
	Coal					Coal					Iron[a]	Total
	ETPS	MTPS	NCTPS	TTPS	Total	ETPS	MTPS	NCTPS[a]	TTPS	Total	Ore	Cargo
1997	2.2	3.4	2.55	1.95	10.1							
1998	2.2	3.4	4.55	1.95	12.1							
1999	2.2	3.4	6.55	1.95	14.1							
2000	2.2	3.4	8.55	1.95	16.1							
2001	2.2	3.4	8.55	1.95	16.1							
2002	2.2	3.4	8.55	1.95	16.1			1.15		1.15		1.2
2003	2.2	3.4	8.55	1.95	16.1	1.2	2.8	1.82	0.98	6.70		6.7
2004	2.2	3.4	8.55	1.95	16.1	1.2	2.8	2.80	0.98	7.68		7.7
2005	2.2	3.4	8.55	1.95	16.1	2.2	3.4	2.80	1.95	10.35		10.4
2006	2.2	3.4	8.55	1.95	16.1	2.2	3.4	2.80	1.95	10.35	2.0	12.4
2007	2.2	3.4	8.55	1.95	16.1	2.2	3.4	5.15	1.95	12.70	2.0	14.7
2008	2.2	3.4	8.55	1.95	16.1	2.2	3.4	5.15	1.95	12.70	2.0	14.7
2009	2.2	3.4	8.55	1.95	16.1	2.2	3.4	7.50	1.95	15.05	4.0	19.1
2010	2.2	3.4	8.55	1.95	16.1	2.2	3.4	7.50	1.95	15.05	4.0	19.1

[a] Projected.

ETPS = Ennore Thermal Power Station, MTPS = Mettur Thermal Power Station, MTPA = million ton per annum, NCTPS = North Chennai Thermal Power Station, PCR = Project Completion Report, and TTPS = Tuticorin Thermal Power Station.

Table A12.2: Cargo Traffic at Ennore (MTPA)

Fiscal Year	Appraisal				PCR							
	Coal				Coal				Other[a]	Iron[a]	POL[a]	Total
	ETPS	MTPS	NMTPS	Total	ETPS	MTPS	NCTPS[b]	Total	Coal	Ore		Cargo
1997	2.2	3.4	2.55	8.2								
1998	2.2	3.4	4.55	10.2								
1999	2.2	3.4	6.55	12.2								
2000	2.2	3.4	8.55	14.2								
2001	2.2	3.4	8.55	14.2								
2002	2.2	3.4	8.55	14.2	0.8		2.60	3.4				3.4
2003	2.2	3.4	8.55	14.2	2.2	3.4	2.80	8.4				8.4
2004	2.2	3.4	8.55	14.2	2.2	3.4	2.80	8.4				8.4
2005	2.2	3.4	8.55	14.2	2.2	3.4	2.80	8.4				8.4
2006	2.2	3.4	8.55	14.2	2.2	3.4	2.80	8.4	3.0	5.0	2.0	18.4
2007	2.2	3.4	8.55	14.2	2.2	3.4	5.15	10.8	3.0	5.0	5.0	23.8
2008	2.2	3.4	8.55	14.2	2.2	3.4	5.15	10.8	3.0	5.0	5.0	23.8
2009	2.2	3.4	8.55	14.2	2.2	3.4	7.50	13.1	5.0	5.0	5.0	28.1
2010	2.2	3.4	8.55	14.2	2.2	3.4	7.50	13.1	5.0	5.0	5.0	28.1

[a] Projected.

ETPS = Ennore Thermal Power Station; MTPS = Mettur Thermal Power Station; MTPA = million ton per annum; NCTPS = North Chennai Thermal Power Station; PCR = Project Completion Report; POL = petroleum, oil, and lubricants; and TTPS = Tuticorin Thermal Power Station.

CORPORATIZATION OF ENNORE PORT

1. Over the past decade, the Asian Development Bank (ADB) has been continuously supporting the Government's privatization policy initiative in the port sector, and Technical Assistance (TA) 2880-IND: *Enhanced India Ports Policy Implementation* was assistance toward this end, with a primary objective of initializing the corporatization of Indian ports by preparing detailed programs for Ennore port and Jawaharlal Nehru port (JNPT).

2. Taking cognizance of the TA recommendations and satisfying the loan covenants, the green-field port of Ennore has been corporatized as Ennore Port Limited (EPL). It has the distinction of being the first Indian port operating as a corporate entity, governed by the Indian Companies Act, 1956, instead of the Major Port Trusts Act, 1963. The port was inaugurated on 1 February 2001, on completion of Phase 1 development in December 2000, and commercial operations commenced from 22 June 2001, when the first vessel carrying thermal coal for Tamil Nadu Electricity Board (TNEB) was handled at Coal Berth II.

3. On completion of Phase 1 and financial restructuring initiated by EPL, the development costs stood at Rs8,230 million. Of this, Rs3,000 million is equity, the Government of India and Chennai Port Trust (CHPT) contributing Rs2,000 million and Rs1,000 million, respectively. The balance Rs5,230 million is debt, which as of March 2002 stood at Rs1,200 million from the Government of India at 14% and Rs3,800 million from Chennai Port Trust at 10.5%. EPL is negotiating with Indian banks, financial institutions, and other ports to swap the government loan portion, to lower the interest burden to 10%, in the wake of a general lowering of interest rates in the country. The Government has conceded to a front loading of the equity portion and provided moratorium up to 2006.

4. EPL was corporatized with an objective of enabling Ennore port to (i) exercise greater autonomy, compared with major port trusts; (ii) follow commercial accounting practices and operate on commercial lines as a profit center; (iii) fix tariffs based on market-related forces and not be subjected to Traffic Authority for Major Ports (TAMP) regulations; (iv) operate as a "landlord" port; and (iv) raise capital through financial instruments in the market, as required. Although EPL has been established as a corporate entity, its shares are held entirely by the Government of India, either directly or through CHPT. The five members of the board of directors are also government personnel.

5. In its first 2 years of operation, EPL has preferred a lean structure, having employed 16 personnel, including its chair, and is commercially oriented. Its operating ratio for FY2003 stood at 13.2%, which is the best among India's major ports. Performance in its second year of operation is considered satisfactory and is largely due to the provision of modern and state-of-the-art coal handling technology and the outsourcing of all operation and maintenance activities to private sector firms.

6. In accordance with the TA recommendations, EPL targets Phase 2 development on a "landlord" port and build-operate-transfer (BOT) concept. EPL, operating as a "landlord" port, would retain the port infrastructure and fulfill its regulatory function and envisages outsourcing to the private sector to provide all other services. In this phase, having benefited from privatization of marine services, maintenance dredging, and bunkering services, EPL plans to privatize the development and operation of bulk cargo terminals, warehouses, ship servicing, and other facilities. EPL would invest in the creation of waterside facilities (deepening of the approach channel and port basin and associated common user facilities), and all other capital investments will be made through private capital, either through operators for multiuser facilities or by captive users. Equipped with modern infrastructure and a trim organization, comprising highly qualified technical staff and well-trained nontechnical staff, Ennore Port would be in a position to offer efficient and cost-effective service, in line with world standards.

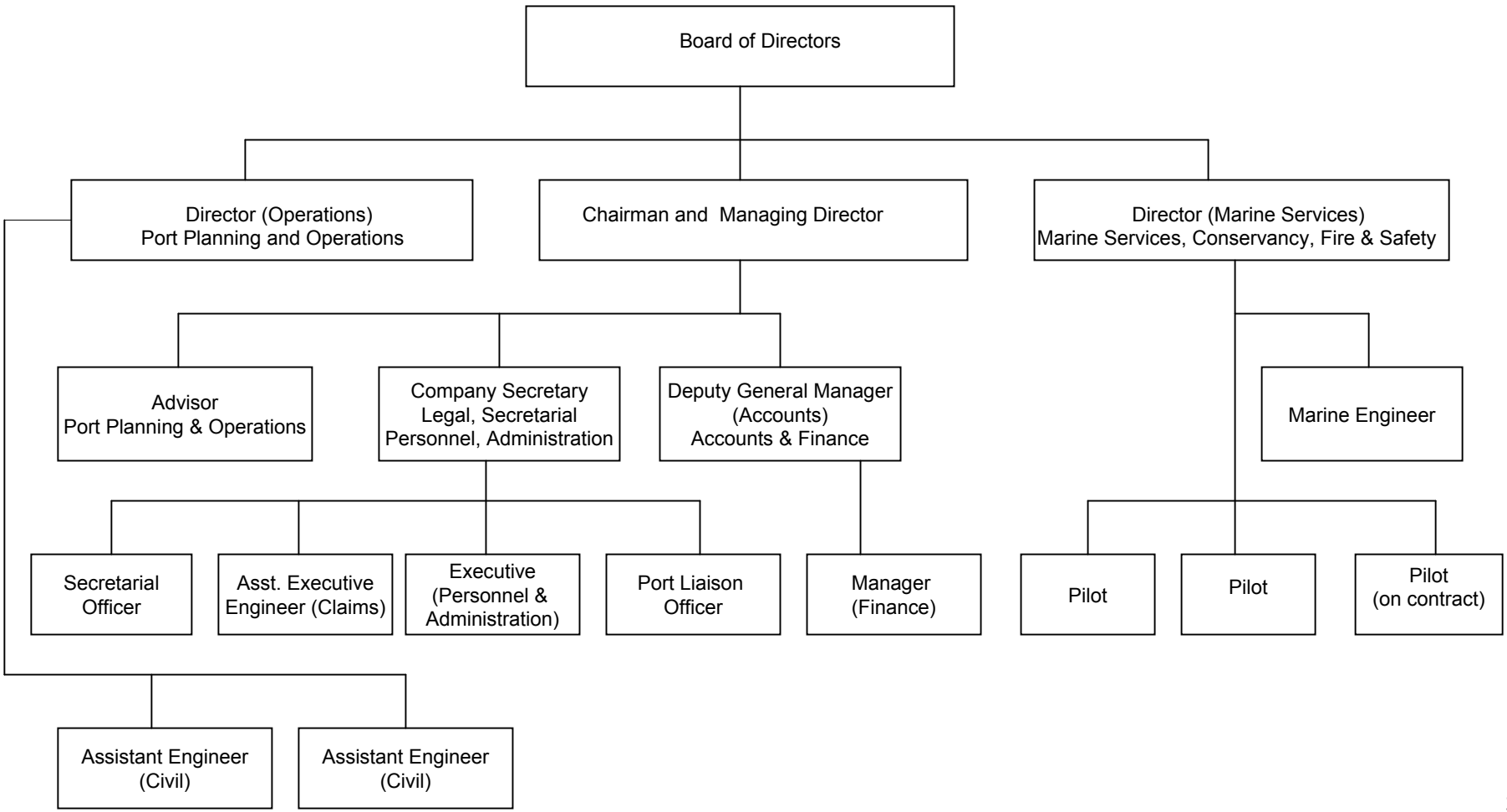
7. EPL is proactively marketing the resources created to establish a coking/industrial coal terminal for the private sector under BOT operation. Initiatives have been taken to develop a marine liquid and a liquefied natural gas terminal. EPL, along with Tamilnadu Industrial Development Corporation, is actively participating in the state government's plans for the development of a special economic zone at Ennore. Over the next 5-year period, expansion on a BOT basis is planned to handle a total cargo of 40 million tons per annum (MTPA) and develop two coal berths, one iron ore berth, one liquefied natural gas berth, and two product and oil lubricant/liquid chemical berths. These facilities could enable the port to handle up to 52 MTPA by FY2010.

8. Ennore port area is currently spread over 445 hectares (ha) of land. EPL is planning to acquire additional land areas of 385 ha and 485 ha (salt land) for future port development.

9. An example has been set, and following a similar ongoing program for JNPT and Haldia Dock Complex, other major ports may need to review their handling rates in comparison with modern and productive ports worldwide.

ORGANIZATION STRUCTURE

Ennore Port Limited



COASTAL SHIPPING SCENARIO IN INDIA

1. A number of studies have been undertaken over the past five decades, starting with Lokur Committee on Rail Sea Coordination, 1957, on the various issues relating to coastal shipping. In 1968, the Estimates Committee expressed their concern for this sector, and since 1969 there have been a series of other studies on the sector that documented the constraints and suggested possible solutions, the latest being the Asian Development Bank (ADB) Technical Assistance (TA) 1771-IND: *Policy Reforms in the Indian Ports and Shipping Sector*.

2. The sector is no longer in the poor state reported in the Pradhan Report (Coastal Shipping Committee, 1981). Coastal shipping reached a peak of 15 million tons per annum (MTPA) in the 1960s and bottomed out to a low of 9 MTPA in the 1970s, soon after the construction of adequate road and rail networks and the imposition of customs controls. It ceased to play its traditional role of moving general cargo commodities and was facing competition from other modes with covert or overt subsidies. With the availability of speed and the convenience of ”door to door” service and the least total cost choice to users, the general cargo traffic of 1960s drifted. The cargo that now moves through coastal routes is bulk traffic (coal, iron ore/pellets, cement, and oil) along the peninsula and traffic from mainland to offshore islands. After falling during the 1960s and 1970s, the coastal tonnages almost quadrupled during the 1980s and grew steadily during the 1990s. From about 67 MTPA handled in 1995, the coastal tonnage increased to 102 MTPA in 2000 and 119 MTPA in 2002. In comparison, all Indian ports combined handled 218 MTPA, 334 MTPA, and 384 MTPA in the commensurate years. The coastal cargo handled at Indian ports is included in Tables A14.1 and A14.2. The share of coastal cargo movement has moved up to 30% from a low of 13% in the 1970s, indicating the potential of coastal shipping.

3. Coastal shipping has been largely controlled by the Government, with regulated tariffs, the shipping lines pressured into serving coastal trade and subsidies. These controls have been relaxed since the early 1990s, and now only the safety aspects are being regulated.

4. During the 1980s and early 1990s, minor ports had a limited share of about 6% of the total coastal trade, handling 7.3 MTPA in 1995. The growth in coastal shipping during the late 1990s is attributable to the development of minor ports, which collectively handled 38 MTPA in 2002, a share of over 30%. The trade at these ports has largely been captive industrial cargo carried on shuttle services, from and to waterfront plants, with no or limited inland transport at either end; the shipments being for single users, carried in full shiploads and handled at dedicated berths. The revival of minor port traffic between the states of Gujarat and Maharashtra, along the western coast of India, due to the distance saved in movement, has been a major contributor to this growth.

5. This trend in port traffic and investment, however, has been skewed in favour of Gujarat, primarily due to the state government's policy of encouraging private sector investment. A number of facilities, ranging from single jetties to multicargo handling private ports, have materialized as a result of the policies of the Gujarat Maritime Board (GMB). GMB ports handled 84 MTPA in 2003—out of which 45 MTPA was handled at Sikka, for Reliance Refinery; 1.79 MTPA by Gujarat Pipapav Port Limited at Pipapav; and 4.2 MTPA by Gujarat Adani Port Limited at Mundra, in Gujarat—and have ambitious expansion plans. Containerized cargo of about 17,000 twenty-foot equivalent units (teu) was handled at Pipavav, and the balance cargo at these locations was mainly oil, coal, and general cargo. Kakinada Sea Port Limited at Kakinada, Andhra Pradesh, on the eastern coast of India, is the only notable entity outside Gujarat where 2.4 MTPA was handled in 2003.

6. Implementation of the Coal Ports Project has demonstrated the fundamental economic rationale that the transportation of cargo in large volumes over large distances can be more beneficial by an intermodal route comprising shipping, when compared with other alternatives. The same rationale may also be applied for coastal movement of containerized cargo through feeder vessels and other bulk cargo (oil and cement).

7. Feasibility studies have been carried out in line with the Government's minor port development strategy for a number of possible minor port locations. Locations at Alewadi, Anjanvel, Dighi, Ganeshgule, Jaigad, Redi, and Vijaydurg in Maharashtra have been offered to the private sector. Possibilities of developing Cuddalore and Cheyyur in Tamilnadu and Vizhinam in Kerala have been studied. Colachel in Tamil Nadu, Dhamra and Gopalpur in Orissa, and Gangavaram and Krishnapatnam in Andhra Pradesh have been offered for development on a build-operate-transfer (BOT) basis.

8. The Government has embraced the concept of commercialization of ports and is taking steps to facilitate private investment in future port expansion plans and corporatization of the existing major ports. Tariff Authority of Major Ports (TAMP) was set up in 1997 to determine the tariff at major ports and to some extent regulate the upswing in private sector participation in port development, through tariff regulation. In addition, the Major Ports Act, 1963 was amended. The Government is now aiming to set up a maritime authority of India to oversee and regulate the development/operational aspects of the maritime sector. The authority would embrace ports, shipping, and inland water transport and replace the existing multiple functionaries such as the Ministry of Shipping; Director General, Shipping; Director General of Lighthouses; TAMP; etc. The objective is to create a rational and harmonious legal and regulatory framework for the port and shipping sector and amend the constitutional provisions related to central and state controlled ports and the existing legal framework.

9. Recognizing the untapped potential of coastal shipping, the office of the Director General, Shipping has taken up an initiative to transform the existing facilities at minor ports and develop coastal shipping integrated with (in a few cases) inland water transport (through effective use of potential waterways, including the Goa waterways and three national waterways—Ganga-Bhagirathi river system, Brahmaputra river system, and the West Coast Canal System). This would result in overall cost effectiveness; relieve the stress on the rail/road network; and reduce route congestion, transit delays, pollution, and the need to acquire rights of way for the expansion of the road/rail network. Moreover, these activities will boost economic and social development in nearby regions.

10. Success of the measures initiated for the alleviation of key deterrents to the development of coastal shipping would be essential. Some of these are:

(i) revamping the ambit of customs control on coastal shipping (the coastal trade has undergone rapid sea change from 1962, when the Sea Customs Act was extended to coastal trade in India);
(ii) evaluating the role of coastal shipping and moving away from its current consideration as an add-on entity to international shipping (the constraints to coastal shipping are being addressed within the overall context of international shipping, since they both have one common decision-making body);
(iii) enabling legislative changes to eliminate hindrances to coastal shipping, through the Merchant Shipping Act (provisions applicable to vessels solely involved in coastal trade could be distinct and might not incorporate the international convention requirements);
(iv) permitting foreign ships to participate in coastal trade licensing policy; and
(v) improving hinterland connectivity (inadequacy of coastal ports without proper hinterland connectivity would be a physical limitation).

11. These trends augur well for the Indian economy. While coastal shipping provides an alternative to transportation by road/rail, development of minor ports and corporatization would lead to intraport competition. Cost of transportation would no longer be based on cost recovery alone but also on the prevalent market forces, necessitating improvements in productivity levels.

Table A14.1: Cargo at Indian Ports
(in MTPA)

Year	Major Ports		Minor Ports		All Ports			% Cst
	Ov	Cst	Ov	Cst	Ov	Cst	Total	
1966	39.0	11.2	3.8	3.9	42.8	15.1	57.9	26.1%
1971	48.1	7.5	4.3	2.4	52.4	9.9	62.3	15.9%
1976	58.2	7.8	4.9	1.6	63.1	9.4	72.5	13.0%
1981	67.6	12.7	5.3	1.4	72.9	14.1	87.0	16.2%
1986	82.5	37.1	6.8	2.3	89.3	39.4	128.7	30.6%
1991	102.7	49.0	9.6	3.2	112.3	52.2	164.5	31.7%
1995	135.8	60.1	15.0	7.3	150.8	67.4	218.2	30.9%
1996	152.1	63.1	18.1	7.6	170.2	70.7	240.9	29.3%
1997	159.9	67.1	18.4	9.4	178.3	76.5	254.8	30.0%
1998	179.0	72.7	29.2	9.4	208.2	82.1	290.3	28.3%
1999	180.1	71.7	24.3	12.0	204.4	83.6	288.0	29.0%
2000	194.0	77.9	38.1	24.5	232.1	102.4	334.4	30.6%
2001	193.5	87.6	56.0	30.9	249.5	118.5	368.0	32.2%
2002	206.3	81.3	58.0	38.4	264.3	119.7	384.0	31.2%

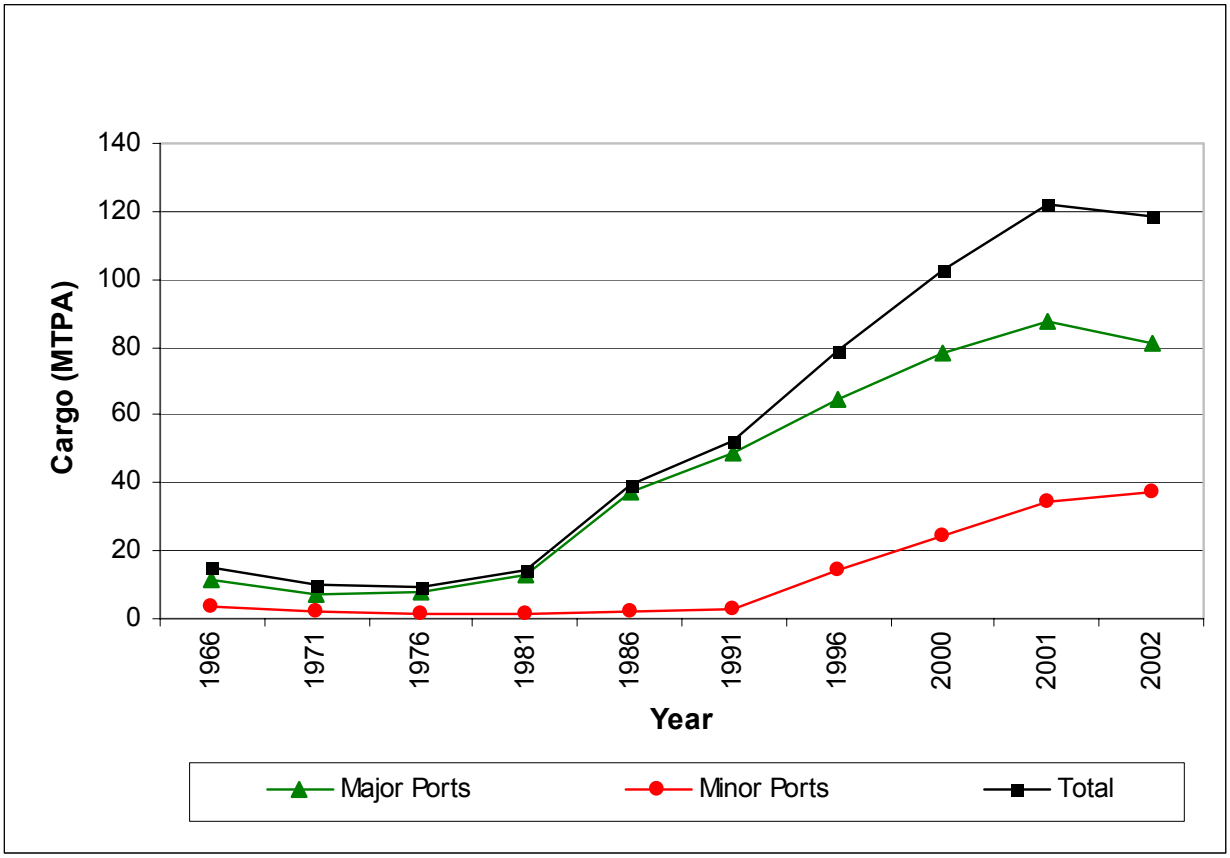
% = percentage.
Cst = coastal, MTPA = million tons per annum, and Ov = overseas.
Source: Basic Port Statistics, an annual publication of MOS.

Table A14.2: Coastal Cargo at Indian Ports
(in MTPA)

Year	Major Ports		Minor Ports		All Ports			% Share
	Uld	Ld	Uld	Ld	Uld	Ld	Total	(Minor Ports)
1966	5.9	5.3	1.7	2.2	7.6	7.5	15.1	25.8%
1971	4.1	3.4	0.9	1.5	5.0	4.9	9.9	24.2%
1976	4.2	3.6	0.6	1.0	4.8	4.6	9.4	17.0%
1981	7.7	5.0	0.6	0.8	8.3	5.8	14.1	9.9%
1986	22.2	14.9	1.0	1.3	23.2	16.2	39.4	5.8%
1991	26.0	23.0	2.0	1.2	28.0	24.2	52.2	6.1%
1995	29.6	30.5	5.4	1.9	35.0	32.4	67.4	10.8%
1996	31.8	31.3	5.1	2.5	36.9	33.8	70.7	10.7%
1997	36.6	30.5	6.1	3.3	42.7	33.8	76.5	12.3%
1998	38.6	34.1	5.2	4.2	43.8	38.3	82.1	11.5%
1999	39.4	32.3	6.3	5.6	45.7	37.9	83.6	14.2%
2000	41.9	36.0	12.9	11.5	54.8	47.5	102.4	23.9%
2001	45.5	42.1	18.2	16.1	63.7	58.2	121.9	28.1%
2002	42.4	38.9	19.9	17.6	62.3	56.5	118.8	31.6%

% = percentage.
Ld = loaded, MTPA = million tons per annum, and Uld = unloaded.
Source: Basic Port Statistics, an annual publication of MOS.

Graph A14.1: Coastal Cargo at Major and Minor Ports



MTPA = million tons per annum

PORT PERFORMANCE INDICATORS

1. India has nearly 5,560 kilometers (km) of coastline and presently has 12 major ports, of which Ennore port is the latest addition. There are 148 minor ports, of which only 30 handle cargo. Ninety-five percent of India's foreign trade by weight/volume and about 70% by value involves transportation by sea. During the first 25 years after independence, aggregate traffic grew modestly from 20 million tons per annum (MTPA) in 1950 to 67 MTPA in 1975, the main commodities being crude oil and iron ore. However, following the liberalization and opening of the Indian economy in the early 1990s, there has been a significant increase in India's maritime trade, with traffic increasing from 165 MTPA in 1991 to over 400 MTPA in 2003. Containerization has shown a steady increase and is about 10% of all traffic at major ports. The Ministry of Shipping has projected the port traffic to grow to a level of 650 MTPA by 2008.

2. The overall capacity utilization for all major ports was about 115% in 1999, and it stood at about 85% in 2002. As the major ports were handling traffic in excess of capacity, the ships had to wait for berths, instead of berths having to wait for ships. The major ports were handling more traffic than their rated capacities, and, although the situation has improved with capacity augmentation, the capacities as rated are about 55% lower than those at comparable ports elsewhere in Asia. The capacity at major ports is expected to increase to about 470 MTPA by 2008.

3. The vessel turnaround time for Indian ports varied from 3.3 days to 8.3 days in 1999, compared with 15 to 35 hours in major European ports and less than a day in Singapore in 1999. This is essentially due to the extremely limited amount of equipment used on the berths. The average availability of equipment at Indian ports is around 70%, compared with 85–90% for other Asian ports. The number of containers handled per ship/hour is 10 at Jawahar Lal Nehru Port Trust (JNPT) port, India's most modern container terminal, compared with 30 in Colombo and 69 in Singapore. While efficiencies have improved since 1995, productivity remains below international standards.

4. The performance of Paradip and Ennore ports is given in Table A15.1. The average preberthing time and the average turnaround time has been significantly reduced for the coal berths at both Paradip and Ennore, compared with other ports. At the same time, commissioning the mechanized coal handling facilities has resulted in an upswing in the output per ship berth day. This improvement in the performance augurs well for the port as well as the users.

Table A15.1: Performance Indicators for Paradip and Ennore Ports

	Paradip Port				Ennore Port	
	New Coal Berths		Other Berths		New Coal Berths	
Indicator	**2002**	**2003**	**2002**	**2003**	**2002**	**2003**
Coal/total cargo handled (MTPA)	1.77	6.66	21.13	23.82	3.40	8.48
Vessels handled (number)	42	142	928	931	71	154
Average pre berthing time (days)	0.580	0.280	0.460	0.410	0.416	0.065
Average turnaround time (days)	2.540	1.980	3.260	2.960	3.624	2.217
Average output per ship berth day (ton)	19,555	28,778	8,831	10,797	16,742	26,777
Idle time to total time at working berth (%)	24.21	18.94	-	-	21.09	16.77

% = percentage.
MTPA = million tons per annum.
Source: Paradip Port Trust and Ennore Port Limited

ECONOMIC AND FINANCIAL REEVALUATION

A. General Methodology

1. The methodology adopted for economic and financial reevaluation was similar to that used at appraisal. For economic evaluation, ”with” and ”without” project scenarios were compared. The ”without” project scenario required the upgrading of the Talcher–Ennore rail link capacities and the ”with” project scenario required the project facilities developed under the loan. The quantifiable benefits from the ”with” project scenario were identified by calculating the savings in the transportation cost per ton of coal. For financial evaluation, the concept of comparing the incremental financial costs and benefit streams was used separately for (i) expansion works at Paradip port and (ii) the development of Ennore port. Although Paradip Port Trust (PPT) plans to use Mechanized Coal Handling Plant (MCHP) facilities to export 4 million tons per annum (MTPA) of iron ore, only coal cargo for Tamil Nadu Electricity Board (TNEB) has been considered in the financial evaluation. For Ennore port, two cases have been evaluated, (i) with only coal cargo for TNEB and (ii) with coal cargo for TNEB and other cargo.

2. Economic and financial viabilities of the project were evaluated by expressing all cost and revenue in the calculations at constant 2003 prices, using the domestic price numeraire, as most of the capital and operations and maintenance costs and all of the economic benefits are in domestic currency (Indian rupees). The annual average exchange rates and Indian wholesale price indices used are in Appendix 4.

B. Costs

3. In the financial evaluation, the capital costs include all incremental capital expenditures for project components and do not include the interest during construction. The operating costs are based on the incremental costs of operating and maintaining the additional assets acquired/developed under the Project and associated incremental costs of handling incremental traffic. Requisite provisions have been made for the residual value of the project assets along the same lines as at appraisal.

4. The economic costs for the ”with” and ”without” project scenarios were derived from the financial costs, by deducting the taxes, duties, and interest during construction and applying a shadow exchange rate factor of 1.11 to the cost of all tradable components. The costs considered include all capital costs associated with the transport chain and the incremental operating and maintenance cost.

5. Without the project, coal for TNEB thermal plants would have continued to move by the erstwhile rail-cum-sea route up to the capacity of 3.85 MTPA at Paradip, and the balance coal would have had to be diverted to the all-rail route. This would have necessitated the upgrading of the Talcher–Ennore rail route over a stretch of about 750 kilometer (km), including double tracking of over 460 km and triple tracking over 290 km and associated capacity improvement works, such as signaling. In addition, about 180 new locomotives and about 4,350 wagons would have been required. In the ”with” project scenario, the cost of upgrading the Talcher–Paradip railway section, including the cost of additionally required rolling stock of about 50 locomotives and 1,220 bottom unloading wagons and 65,000 deadweight ton (dwt) vessels have been included. The rail operating costs were calculated using data collected from the Ministry of Railways. These exclude any capital-related components. The savings in the incremental operation and maintenance costs between ”with” project and ”without” project scenarios are included in Table A16.1.

C. Revenue

6. In the financial evaluation, incremental revenue generated/estimated for project components is based on (i) incremental coal cargo traffic being/to be served by these project components and (ii) port tariffs being paid by TNEB and other users of the port facilities at Ennore and Paradip ports. Tariff Authority for Major Ports (TAMP), through its order of 5 November 2001, has approved telescopic rates for handling coal through MCHP at Paradip port. Accordingly, TNEB is charged at Rs200 per ton, Rs190 per ton, and Rs180 per ton for coal through MCHP up to 7.5 MTPA, from 7.5 MTPA, 10 MTPA, and beyond 10 MTPA, respectively. It has also advised PPT to formulate a plant efficiency-linked tariff scheme for MCHP. EPL does not come under TAMP regulations and has negotiated tariffs with TNEB and fixed the same at Rs90 per ton of coal handled at Ennore port. No increase in the tariff from these levels, in real terms, has been considered.

D. Economic Reevaluation

7. The economic internal rate of return (EIRR) has been computed at 17.5% (Table A16.2), against the appraisal estimate of 22.3%. There has been an increase in the savings in the operation and maintenance costs for the ”with” project scenario, compared with the ”without” project scenario, since appraisal, which has a positive impact on the EIRR. However, EIRR has decreased on account of the negative impact of (i) the decline in the coal traffic in the ”with” project scenario, from 16.1 MTPA at appraisal to 15.05 MTPA, at Paradip port, and from 14.2 MTPA at appraisal to 13.1 MTPA, at Ennore port; and (ii) delays in the realization of peak cargo.

8. The difference in the operating and maintenance costs for the transportation link elements of the scenarios considered indicates that the operating and maintenance costs for the ”with” project scenario are cheaper by Rs66, against the Rs42 per ton (Table A16.2) computed at the time of the appraisal in July 1992. Similarly, the average transport cost for the ”with” project scenario is cheaper by Rs126, against Rs74 per ton of coal transported (Table A16.3).

E. Financial Reevaluation

9. The financial internal rate of return (FIRR) estimated at appraisal and revaluated in the Project Completion Report (PCR), for each component, is summarized below:

Project Component	At Appraisal (%)	At PCR (%)
a. Expansion of Paradip	8.3	14.6
b. Development of Ennore		
- with only TNEB coal cargo	8.0	5.1
- with TNEB coal and other cargo	-	7.1

PCR = Project Completion Report and TNEB = Tamil Nadu Electricity Board.

10. Detailed cost-benefit streams and FIRR calculations are included in Tables A16.4, A16.5, and A16.6. In the case of Paradip port, although project cost has increased, projected coal movement through the link has declined by about 1 MTPA, and there has been a delay in realization of peak cargo, the FIRR has significantly increased, essentially due to the tariff rates approved by TAMP, which are based on a cost recovery basis at Rs200 per ton. In the case of Ennore port, FIRR has significantly decreased, as EPL had to offer competitive tariff rates, at about Rs90 per ton, to TNEB, to afford a significant advantage against the Rs35 per ton being paid at Chennai port. Considering the other additional cargo at Ennore emanating from the implementation of expansion plans of Ennore Port Limited (EPL), the FIRR improves to 7.1%. The FIRR is above the weighted average cost of capital (WACC) of 5% in real terms.

Table A16.1: Economic Evaluation

Savings in Operations and Maintenance Costs

With Project

Thermal Power Station	Rail Link Ta-Pa/ En-TPS Rs/t		Paradip Port Rs/t		Ennore/Tuticorin Port Rs/t		Shipping Link Pa-En/Pa-Tu Rs/t		Extra Rail Loading at NMTPS Rs/t	
	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
Ennore	60.30	52.00	18.90	35.58	19.20	21.66	46.80	52.85	6.60	9.12
Mettur	102.31	141.36	18.90	35.58	19.20	21.66	46.80	52.85	10.20	14.09
NMTPS	36.29	50.14	18.90	35.58	19.20	21.66	46.80	52.85		
Tuticorin	36.29	50.14	18.90	35.58	19.20	36.15	92.25	104.18		

En = Ennore, km = kilometer, Pa = Paradip, PCR = Project Completion Report, Rs = Rupees, Ta = Talcher, t = metric ton, TPS = thermal power station, and Tu = Tuticorin.

Without Project

Thermal Power Station	Rail Link Ta-Pa/ En-TPS Rs/t		Paradip Port Rs/t		Chennai/Tuticorin Port Rs/t		Shipping Link Pa-Ch/Pa-Tu Rs/t		Rail Link Ta-TPS Rs/t	
	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
Ennore									153.00	211.40
Mettur									200.16	276.56
NCTPS	36.29	50.14	62.70	80.35	55.20	70.38	99.84	112.67	153.00	211.40
Tuticorin	36.29	50.14	62.70	80.35	19.20	66.77	153.75	173.89		

Ch = Chennai, En = Ennore, km = kilometer, NCTPS = North Chennai Thermal Power Station, Pa = Paradip, PCR = Project Completion Report, Rs = Rupees, Ta = Talcher, t = metric ton, TPS = thermal power station, and Tu = Tuticorin.

Thermal Power Station	Total Operations and Maintenance Cost (Rs/t)					
	With Project		Without Project		Savings	
	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
Ennore	151.80	171.21	153.00	211.40	1.20	40.19
Mettur	197.41	265.55	200.16	276.56	2.75	11.01
NCTPS	121.19	160.23	175.45	237.27	54.26	77.04
Tuticorin	166.64	226.05	271.94	371.15	105.30	145.11
Average	**146.97**	**194.16**	**189.29**	**259.71**	**42.31**	**65.55**

NCTPS = North Chennai Thermal Power Station, PCR = Project Completion Report, Rs = Rupees, and t = metric ton.

Source: Staff estimates.

Table A16.2: Economic Evaluation

Transport System Cost (With Project Scenario)

(Rs million)

Fiscal	Rail Link				Paradip Port				Shipping Link				Ennore Port and Extra Loading				Total				Total Transport System Cost	
	Capital		O&M		Capital		O&M		Capital		O&M		Capital		O&M		Capital		O&M			
Year	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR
1992																						
1993	96				19								52				166				166	
1994	542				359				222				507				1,630				1,630	
1995	1,434				1,134	91			444				1,487	69			4,499	160			4,499	160
1996	1,530				1,701	78			1,332				2,618	101			7,181	179			7,181	179
1997	1,179	66	644		567	413	191		1,332		561		1,284	491	206		4,362	970	1,602		5,964	970
1998	637	751	716			638	229		888		655			870	244		1,525	2,259	1,844		3,369	2,259
1999		833	789			1,396	266		222		749			2,015	282		222	4,244	2,086		2,308	4,244
2000		1,197	862			1,603	304			1,586	842			2,444	321			6,830	2,329		2,329	6,830
2001		2,294	862			960	304			1,903	842			1,395	321			6,552	2,329		2,329	6,552
2002		1,154	862	58		539	304	41		1,268	842	61		1,002	321	25		3,964	2,329	184	2,329	4,149
2003		790	862	589			304	238		0	842	404			321	173		790	2,329	1,404	2,329	2,194
2004		424	862	638			304	273		1,586	842	456			321	194		2,009	2,329	1,561	2,329	3,570
2005		395	862	833			304	368			842	647			321	250		395	2,329	2,098	2,329	2,494
2006			862	833			304	368			842	647			321	250			2,329	2,098	2,329	2,098
2007			862	951			304	452			842	771			321	301			2,329	2,475	2,329	2,475
2008			862	951			304	452			842	771			321	301			2,329	2,475	2,329	2,475
2009			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2010			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2011			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2012			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2013			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2014			862	1,069			304	536			842	896			321	352			2,329	2,852	2,329	2,852
2015				1,069				536				896				352				2,852		2,852
2016				1,069				536				896				352				2,852		2,852
2017				1,069				536				896				352				2,852		2,852
2018				1,069				536				896				352				2,852		2,852
2019				1,069				536				896				352				2,852		2,852
2020				1,069				536				896				352				2,852		2,852
2021				1,069				536				896				352				2,852		2,852

App = Appraisal, O&M = operations and maintenance, and PCR = Project Completion Report.

Source: Staff estimates.

Table A16.3: Economic Calculations

Transport System Cost (Without Project Scenario)
(Rs million)

Fiscal Year	O&M Costs for Rail/Sea Route Option as at Appraisal								All Rail Route				Total				Total Transport System Cost		Net Benefit Stream	
	Rail Link		Port Link		Shipping Link		Total		Capital		O&M		Capital		O&M					
	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR	App	PCR
1992																				
1993																			(166)	
1994									608				608				608		(1,022)	
1995									1,899				1,899				1,899		(2,600)	(267)
1996									4,786				4,786				4,786		(2,396)	(265)
1997	140		384		490		1,013		6,077		566		6,077		1,579		7,656		1,692	(1,331)
1998	140		346		490		975		2,507	2,666	1,273		2,507	2,666	2,248		4,755	2,666	1,386	535
1999	140		346		490		975		2,507	2,666	1,979		2,507	2,666	2,954		5,461	2,666	3,153	(1,981)
2000	140		346		490		975		608	4,000	2,685		608	4,000	3,660		4,268	4,000	1,939	(3,355)
2001	140		346		490		975			7,999	2,685			7,999	3,660		3,660	7,999	1,332	1,662
2002	140	58	346	173	490	130	975	361		4,000	2,685	317		4,000	3,660	678	3,660	4,677	1,332	554
2003	140	45	346	131	490	161	975	337		2,666	2,685	1,596		2,666	3,660	1,932	3,660	4,599	1,332	2,487
2004	140	94	346	279	490	271	975	644		1,333	2,685	1,596		1,333	3,660	2,240	3,660	3,573	1,332	3
2005	140	143	346	423	490	440	975	1,006		1,333	2,685	1,596		1,333	3,660	2,602	3,660	3,935	1,332	1,441
2006	140	143	346	423	490	440	975	1,006			2,685	1,596			3,660	2,602	3,660	2,602	1,332	503
2007	140	261	346	777	490	705	975	1,743			2,685	2,092			3,660	3,835	3,660	3,835	1,332	1,360
2008	140	261	346	777	490	705	975	1,743			2,685	2,092			3,660	3,835	3,660	3,835	1,332	1,360
2009	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2010	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2011	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2012	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2013	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2014	140	379	346	1,131	490	970	975	2,480			2,685	2,589			3,660	5,069	3,660	5,069	1,332	2,217
2015		379		1,131		970		2,480				2,589				5,069		5,069		2,217
2016		379		1,131		970		2,480				2,991				5,470		5,470		2,619
2017		379		1,131		970		2,480				2,991				5,470		5,470		2,619
2018		379		1,131		970		2,480				2,991				5,470		5,470		2,619
2019		379		1,131		970		2,480				2,991				5,470		5,470		2,619
2020		379		1,131		970		2,480				2,991				5,470		5,470		2,619
2021		379		1,131		970		2,480				2,991				5,470		5,470		2,619

Average Transport Cost (Rs per ton)

	Appraisal	PCR
With Project	216.2	279.8
Without Project	290.4	405.7
Savings	**-74.3**	**-125.9**

Economic Internal Rate of Return	Appraisal	PCR
	22.3%	**17.5%**

App = Appraisal, O&M = operations and maintenance, and PCR = Project Completion Report.

Source: Staff estimates.

Table A16.4: Financial Evaluation - Expansion of Paradip Port

(Rs million)

Fiscal	Capital Costs		O&M		Revenue		Net Flow	
Year	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
1992								
1993	244						(244)	
1994	488		42				(530)	
1995	1,463	164	105				(1,568)	(164)
1996	2,194	112	140				(2,334)	(112)
1997	488	637	140		455		(173)	(637)
1998		965	210		627		417	(965)
1999		2,111	229		767		538	(2,111)
2000		2,218	244		872		628	(2,218)
2001		1,069	263		844		581	(1,069)
2002		748	263	32	844	241	581	(538)
2003			263	288	844	1,385	581	1,097
2004			263	353	844	1,533	581	1,180
2005			263	562	844	2,038	581	1,476
2006			263	562	844	2,038	581	1,476
2007			263	567	844	2,461	581	1,894
2008			263	567	844	2,461	581	1,894
2009			263	582	844	2,884	581	2,302
2010			263	582	844	2,884	581	2,302
2011			263	582	844	2,884	581	2,302
2012			263	582	844	2,884	581	2,302
2013			263	582	844	2,884	581	2,302
2014			263	582	844	2,884	581	2,302
2015	-1,463		263	582	844	2,884	2,044	2,302
2016				582		2,884		2,302
2017				582		2,884		2,302
2018				582		2,884		2,302
2019				582		2,884		2,302
2020				582		2,884		2,302
2021		-2,407		582		2,884		4,709

Financial Internal Rate of Return	Appraisal	PCR
Base Case	8.3%	**14.6%**
O&M cost +10%	7.7%	**12.0%**
Revenue -10%	6.7%	**10.9%**
Cost/Benefits +/- 10%	6.1%	**10.6%**

BOT = build-operate-transfer, MCHP = Mechanized Coal Handling Plant, O&M = operations and maintenance, PCR = Project Completion Report, PPT = Paradip Port Trust, and TAMP = Tariff Authority for Major Ports.

Notes: 1. Fiscal Year 2003 ends in March 2003.
2. PPT plans to handover O&M of MCHP to BOT operator for 20 years starting Jan 2004.
3. TAMP has advised PPT to suitably revise MCHP tariff by linking it to plant efficiency.

Source: Staff estimates.

Table A16.5: Financial Evaluation - Development of Ennore Port
(with only TNEB Coal Cargo)
(Rs million)

Fiscal	Capital Costs		O&M		Revenue		Net Flow	
Year	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
1992	53						(53)	
1993	529		25				(554)	
1994	1,323		82				(1,405)	0
1995	2,117	124	125				(2,242)	(124)
1996	1,270	119	132		448		(954)	(119)
1997		905	185		558		373	(905)
1998		1,241	185		668		483	(1,241)
1999		2,866	185		778		593	(2,866)
2000		2,481	185		778		593	(2,481)
2001		903	185		778		593	(903)
2002		75	185	43	778	308	593	189
2003			185	99	778	782	593	683
2004			185	309	778	756	593	448
2005			185	309	778	756	593	448
2006			185	309	778	756	593	448
2007			185	309	778	968	593	659
2008			185	309	778	968	593	659
2009			185	309	778	1,179	593	871
2010			185	309	778	1,179	593	871
2011			185	309	778	1,179	593	871
2012			185	309	778	1,179	593	871
2013			185	309	778	1,179	593	871
2014			185	309	778	1,179	593	871
2015	(1,588)		185	309	778	1,179	2,181	871
2016				309		1,179		871
2017				309		1,179		871
2018				309		1,179		871
2019				309		1,179		871
2020				309		1,179		871
2021		(2,615)		309		1,179		3,486

Financial Internal Rate of Return	Appraisal	PCR
Base Case	8.0%	**5.1%**
O&M cost +10%	7.6%	**3.1%**
Revenue -10%	6.5%	**2.4%**
Cost/Benefits +/- 10%	6.1%	**2.1%**

BOT = build-operate-transfer, O&M = operations and maintenance, PCR = Project Completion Report, TAMP = Tariff Authority for Major Ports, and TNEB = Tamil Nadu Electricity Board.

Notes: 1. Fiscal Year 2003 ends in March 2003.
2. Only TNEBs coal cargo at Ennore considered

Source: Staff estimates.

Table A16.6: Financial Evaluation - Development of Ennore Port
(with TNEB Coal and Other Cargo)
(Rs million)

Fiscal	Capital Costs		O&M		Revenue		Net Flow	
Year	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR	Appraisal	PCR
1992	53						(53)	
1993	529		25				(554)	
1994	1,323		82				(1,405)	
1995	2,117	124	125				(2,242)	(124)
1996	1,270	119	132		448		(954)	(119)
1997		905	185		558		373	(905)
1998		1,241	185		668		483	(1,241)
1999		2,866	185		778		593	(2,866)
2000		2,481	185		778		593	(2,481)
2001		903	185		778		593	(903)
2002		75	185	43	778	308	593	189
2003			185	99	778	782	593	683
2004			185	309	778	756	593	448
2005			185	309	778	756	593	448
2006		1,600	185	403	778	1,146	593	(857)
2007			185	418	778	1,487	593	1,069
2008			185	418	778	1,487	593	1,069
2009			185	433	778	1,774	593	1,342
2010			185	433	778	1,774	593	1,342
2011			185	433	778	1,774	593	1,342
2012			185	433	778	1,774	593	1,342
2013			185	433	778	1,774	593	1,342
2014			185	433	778	1,774	593	1,342
2015	(1,588)		185	433	778	1,774	2,181	1,342
2016				433		1,774		1,342
2017				433		1,774		1,342
2018				433		1,774		1,342
2019				433		1,774		1,342
2020				433		1,774		1,342
2021		(3,095)		433		1,774		4,437

Financial Internal Rate of Return	Appraisal	PCR
Base Case	8.0%	**7.1%**
O&M cost +10%	7.6%	**5.1%**
Revenue -10%	6.5%	**4.3%**
Cost/Benefits +/- 10%	6.1%	**4.0%**

BOT = build-operate-transfer; EPL = Ennore Port Limited; O&M= operation and maintanence; PCR = Project Completion Report, POL = petroleum, oil, and lubricants; and TNEB =Tamil Nadu Electricity Board.

Notes: 1. Fiscal Year 2003 ends in March 2003.
2. EPLs BOT expansion plans considered (TNEB coal, Iron Ore, POL and other coal cargo)

Source: Staff estimates.

ENVIRONMENTAL MONITORING AND COMPLIANCE

1. The project facilities at Paradip and Ennore were designed to meet the statutory environmental standards stipulated in the environmental clearance certificates issued by the Ministry of Environment and Forests. The clearance requires an assessment of the environment impact assessment and preparation of an environment and crisis management plan. Preparation and adoption of the crisis management plan in case of a disaster originating from transport, transshipment, and storage of coal at Paradip by Paradip Port Trust (PPT) and at Ennore by Ennore Port Limited (EPL) was required in accordance with the Loan Agreement. Compliance with the Ministry of Environment and Forest's Coastal Regulation Zone Notification, 1991 and Gazette Notification April, 1997 are also required. Clearances were obtained for project works at Paradip and Ennore.

A. Expansion of Paradip Port

2. The environmental impact during the construction phase was mainly due to dredging, land filling, stackyard development, and the construction of two new coal berths. Land filling and dredging have resulted in a marginal decrease in the production of biomass. Water sprinklers were used to minimize dust during the leveling works for the development of the stackyard. As the coal handling plant was developed away from other port facilities, toward one end of the port area, there were no other significant environment impacts during construction.

3. Coal handling operations, such as unloading at the Rail Receiving Station (RRS), transportation by conveyors, stacking/reclaiming from stackyard, and loading into ships are expected to result in coal dust generation. During operations, an effective dust suppression system has been provided by way of water sprinklers. An impermeable layer has been laid below the stackyard area, leading stretches and concrete-lined settling ponds have been provided to prevent the contamination of groundwater. Covered conveyor galleries and transfer houses have been erected to stem pollution from dust. A crisis management plan designed to deal with all foreseeable disasters emanating from the transport, transshipment, and storage of coal has been integrated with that of the port.

4. Suspended particulate matter (SPM) and gases like SO_2 and NO_x are within specified limits as are sulphates, nitrates, phosphates, and heavy metals. High SPM levels were detected at the RRS and stacker facilities. The levels were primarily due to the high content of fines.

5. The port has a large green area, covering about 110 hectares (ha) of which 30 ha are under mangroves. A shelter belt and wind break plantation have been developed in the coal handling area, covering about 5 ha. This includes a plantation of mangroves and trees of various species. Environmental protection works and greenbelt development were undertaken at a cost of about Rs6 million, during the Project's implementation period.

B. Development of Ennore Port

6. The environmental impact during construction was largely a result of the quarrying activities undertaken for the production of stone material for the breakwaters and marine works. The procurement of stones was carried out in the Karikal hills, 120 kilometers (km) from Ennore. The stones were produced by controlled blasting, sorted and transported to Melapakkam transfer station by road and thereafter by rail lines to the work spot at Ennore, to reduce the likelihood of traffic accidents and air and noise pollution. The material was transported by the shortest possible route, by adopting a mixed mode and avoiding populated areas, to reduce environmental pollution. No plans for replacement/replenishment of the landscape at the quarry site were implemented.

7. The construction of an armor-protected rubble mound groyne, south of Ennore creek, has not been undertaken, though recommended by the consultant. This will be more relevant when the approach channel is dredged upto 18 meters depth, in future stages. Detailed siltation and coastal management studies are being undertaken, to ascertain long-term development effects and the exact requirements. Meanwhile, the coastline has undergone marked changes, with sand accretion on the south and coastal erosion and inundation being reported in the coastal stretches in the port's vicinity.

8. A mechanized coal handling system has been set up at Ennore port. The system carries coal up to the North Chennai Thermal Power Station stackyard immediately after unloading the coal from the ship, and no coal is being stacked within the port's premises.

9. Afforestation measures have been targeted in an area of 50 ha, of which 15 ha have been planted with over 8,000 trees of various species. A greenbelt has been developed within the port area and along the banks of the backwaters and Buckingham canal, a low-lying swamp in the north. West of EPL, land has been identified for the development of mangroves and a groundwater recharge zone.

10. Dust suppression systems, comprising water sprinklers, covered conveyor galleries, and dust extraction systems were provided on the jetty and at all the junction towers, to contain coal dust, as envisaged during appraisal. A crisis management plan designed to deal with all foreseeable disasters that might affect the port has been implemented.

C. Environmental Monitoring

11. Detailed baseline studies of the environmental conditions at both Paradip and Ennore, entrusted to private sector firms, are being undertaken to monitor and assess the changes to the environmental regimen. Premonsoon and postmonsoon soundings and bathymetric/siltation studies and monitoring are being carried out. A management plan for the conservation of Pulicat lake, an important area for water birds 25 km north of Ennore island, and coastal morphology is being formulated for implementation.

Table A17.1: Compliance with Conditions Stipulated by the Ministry of Environment and Forests

	Condition	Action Taken
1.	During construction and operation and maintenance stages, water and sediment quality, both inside and outside the harbor are to be measured at regular intervals to check levels of turbidity, PH, dissolved oxygen, ammonical nitrogen, heavy metals, hydrocarbons, pesticides, and other nutrients.	Complied with. The mentioned parameters have been measured and reported in the environmental impact assessment report prepared and sent to the Ministry of Environment and Forests (MOEF). The water and sediment samples collected from several locations within and outside the harbor are periodically analyzed for various physical parameters—temperature, PH, conductivity, TSS, TDS, chlorinity, salinity, hardness, DO, BOD, COD, total alkalinity, oil and grease, and turbidity and chemical parameters—concentration of heavy phosphates, nitrates, and ammonia. Frequency and number of such measurements will increase as the amount of cargo handled increases.
	To prevent pollution of the marine environment and leakage of heavy metals to groundwater layers, provision of settling ponds and surge storage facilities are to be included at Paradip port. It is also necessary to include an impermeable foundation for the stockpiles and drainage ditches for the settling ponds.	Complied with. The stackyards at Paradip port have been constructed with a longitudinal gradient of 1 in 500 and a transverse gradient of 1 in 50, to enable easy drainage to two settling ponds provided at the ends. The settling ponds discharge the overflow water into a process water pond, which is located between the settling ponds and connected through a spillway. The process water pond is connected to a raw-water pump house through a pipeline and is filled at regular intervals, as necessary. The process water pond is the source for dust suppression. All water that may come in contact with coal dust is collected in open drains and passed on to the settling ponds before being discharged. In addition, an impermeable foundation material (Low Density Polyethylene [LDPE]) is laid under the stackyard, stacker/ reclaimer, berms/slopes, settling and process water ponds, and their slopes and beds. This prevents contamination of ground water.
	A treatment plant for treating waste water, sewage, and sullage is to be provided, to prevent pollution of harbor waters at Paradip port.	Complied with. The water from the stockpiles and other coal contact areas is directed to settling ponds before being discharged into the process water pond. Sewage lagoons in the shape of primary ponds (where sewage is detained for about 20 days) and secondary ponds (where primary pond overflow is further detained for 10 days) are being used to treat a majority of the sewage and sullage from the facilities. All the ponds have been provided with an impervious lining in the slopes and beds to prevent leakage and consequential contamination of groundwater. Further, septic tanks are also used to treat sewage from amenities at isolated locations in the new facilities.

	Condition	Action Taken
4.	Provide the following dust control measures to suppress and keep the concentration of dust and other suspended particulate matter within prescribed limits: (i) adequate stockpile spray system with automatic control. (ii) fully enclosed continuous loaders/unloaders. (iii) roofed conveyor belts. (iv) dust extraction systems at all transfer points.	Complied with. (i) Dust control is being achieved by an automatically controlled stockpile spray system that consists of spray nozzles approximately 40 meters apart on both sides of the stockyards. (ii) RRS area for unloading wagons is an enclosed structure, as are all transfer towers. (iii) Roofed conveyor belts have been provided at Paradip and Ennore using precoated galvanized iron sheets. (iv) Dust suppression measures are provided at all transfer points, RRS, stacking, reclaiming and ship-loading locations. Wash downs at transfer points in the form of settling pits have been provided, which are periodically cleaned and evacuated. These provisions keep the dust and SPM levels within the prescribed limits.
5.	To carry out a study with reference to air quality, solid waste disposal, noise, and the marine environment in the area, an environmental impact assessment report and environmental management plan—covering the above aspects as well as health monitoring of workers engaged, a risk analysis of the transportation of cargo, safe disposal of wastes and dredged material containing heavy metals— are to be prepared and submitted to MOEF for approval.	Complied with. PPT and CHPT used the services of private sector firms for an environment impact assessment study and preparation of an environment management plan. The reports comprised various baseline data related to air, noise, soil, water, biological and socioeconomic components, and evaluation and prediction of their impacts on the environment after the completion of the Project. An environment management plan and approach to disaster management plan were also included in this report. A copy of the report was sent to MOEF for clearance. Subsequently, crisis management plans were put in place at Ennore and integrated into the existing plans at Paradip.
6.	Ensure that wastes/dredged material containing coal or other heavy metals is disposed of safely at specific locations designated for such purpose.	Complied with. The dredged material at Paradip and Ennore was found to be suitable and was utilized as landfill material for the low lying stackyard area at Paradip and development of port area and beach replenishment at Ennore.
7.	Ensure the provision of commensurate infrastructure facilities, such as water and power supply, sewerage and drainage systems, and fire fighting, for the proposed project facilities, and ensure that these are linked to existing facilities in the case of Paradip port.	Complied with. All arrangements for the supply of potable water to the port amenities, stackyards, and the berth area for ships have been completed. The existing facilities at Paradip port have been upgraded by constructing a new potable-water pump house and storage sump along with reticulation pipelines. Power supply along with suitable reception arrangements and adequate sewerage, drainage, and fire fighting facilities have been provided and linked to existing facilities in the case of Paradip port.

	Condition	Action Taken
8.	Maintenance dredging is to be carried out with the best practicable technology and operating methods to minimize sediment release. The dredged material is to be disposed of safely at specified locations designated for such purpose.	Complied with. Maintenance dredging, a basic requirement for efficient port operation, is an annual activity at Paradip and has been undertaken once at Ennore. The dredged material is being pumped onshore for reclamation of low-lying areas or pumped to a location north of the north breakwaters at both Paradip and Ennore for beach replenishment.
9.	Ensure adequate noise control measures, such as fitting mufflers, installing rubber peddles, and providing headphones/earplugs to all workers working in high noise environments.	Complied with. Noise control measures are being provided as necessary to meet the prescribed standards. Mufflers have beer provided for all combustion engines. High noise areas have been designated and signs posted. Workers likely to enter such areas are being issued ear protection.
10.	Quality of treated effluents, solid wastes, noise levels, etc., are to conform to the standards laid down by competent authorities.	Complied with. The quality of treated effluents and levels of solid waste emission and noise generation are well within standards laid down by competent authorities.
11.	Periodic monitoring is to be undertaken to determine the noise pollution levels at strategic points in the port area.	Complied with. Periodic monitoring to determine noise pollution levels at identified strategic points in the port area is carried out by outside firms.
12.	A greenbelt development plan, as proposed, must be carried out. In addition, suitable species of trees should be planted, in consultation with Forest Department, along existing roads, open spaces, and along the shore line.	Complied with. Within the PPT township and shoreline in general, plantation schemes continue to get top priority. The plans are being executed departmentally and through the State Forest and State Soil Conservation Departments. Paradip has a large green area covering about 110 ha, of which 30 ha are under mangroves. A shelter belt and wind break plantation have been developed in the MCHP area, in about 5 ha, comprising casuarina and trees of other species. At Ennore, an area of about 15 ha has been planted with over 8,000 trees of various species, and a greenbelt has been developed within the port area and along the banks of the backwaters and Buckingham canal.
13.	A comprehensive crisis/disaster management plan based on studies related to likely damage caused by accidents and/or fire is to be prepared and submitted to MOEF for its approval.	Complied with. A comprehensive crisis management plan has been delineated and implemented at Ennore and at Paradip. The same has been integrated into the port plan for dealing with disaster management.

	Condition	Action Taken
14.	Have reputed institutes carry out scientific studies related to the long-term impacts of the proposed facilities on nearby coastal areas/beaches and the sediment movement pattern.	Complied with. A working hydraulic model of Paradip, constructed at CWPRS, Pune, was used, and it was found that the coal berths within the existing harbor protected by breakwaters would have no significant effect on adjacent coastal areas and beaches and there would be no significant change in the sediment movement pattern. The breakwater alignments at Ennore were modified following detailed modeling studies during the implementation phase. Further, detailed siltation and coastal management studies are being undertaken by the National Institute of Oceanography, Goa, to ascertain long-term development effects and exact coastal protection requirements at Ennore.

SOCIAL IMPACT

1. Benefit monitoring and evaluation studies were carried out for the expansion of Paradip port and development of Ennore port. The objectives of the studies were to assess economic benefits, likely beneficiaries, socioeconomic development, and environmental impacts. These reports were submitted in November 2000 and February 2000, respectively.

A. Paradip Port

2. The expansion works for the development of the coal handling plant and coal berths were undertaken within the port area. About 2,470 individuals living in squatter tenements and slum dwellings in the area were affected and had to be relocated. They were rehabilitated in a resettlement colony 3 kilometers (km) away. The area was developed and provided with amenities, such as an access road, storm water drains, street lighting, drinking water, and electricity services. Each family was compensated through the allotment of a residential piece of land in this area free of cost. Paradip Port Trust (PPT) spent Rs23.9 million on this effort. The rehabilitation and compensation efforts satisfied the prevailing norms in India at the time of land acquisition and project implementation and were consistent with the spirit of the Asian Development Bank (ADB) involuntary resettlement policy, which did not become mandatory until 1995.

3. About 320 workers involved in the handling of coal at the loading facilities of the old coal berths were affected by the development of the mechanised coal handling plant. The old berths and stackyard area are now being used for the import of coking coal, at about 1.9 million tons per annum (MTPA). About 60 workers have been engaged in wagon loading activities associated with this imported cargo, and the remaining workers are being paid a daily subsistence allowance, for sustenance. PPT is studying the feasibility of developing a mechanised coal unloading facility at these berths. The operation and maintenance activities of the mechanized plant are being outsourced to private operators, for which bid documents have been floated, which will offer employment opportunities to about 280 skilled workers at the plant and have a multiplier effect on education, general trade, and commerce in the Paradip township area.

B. Ennore Port

4. Ennore is a new and green-field port. Acquisition of land at the port location was carried out by Tamil Nadu Electricity Board (TNEB) and Tamil Nadu Industrial Development Corporation (TIDCO), which acquired the land, undertook effective rehabilitation and resettlement measures, and charged the costs to Ennore Port Limited (EPL). Of the 445 hectares (ha) of land presently with EPL, 39 ha were government owned (around Poramboke village), 19 ha were privately owned (acquired around Ennore village), and 387 ha were located around Puzhuthivakkam village and a few small hamlets, which involved a total of about 2,030 families. Rs148.51 million was paid by EPL toward the costs of acquiring this land. 120 square meters of land was provided to each of these families in a resettlement colony developed by TIDCO. The amenities provided in the colony included hand pumps for drinking water, all-weather roads, storm-water drains, street lighting, school buildings with asbestos corrugated roofing, and public toilets. The rehabilitation and compensation efforts satisfied the prevailing norms in India at the time of land acquisition and project implementation and were consistent with the spirit of ADB's involuntary resettlement policy, which did not become mandatory until 1995. EPL is currently planning to acquire additional land areas of 385 ha and 485 ha (salt land) for future port development.

5. The TIDCO industrial area, in the immediate vicinity of Ennore, has benefited from the development activities, which have resulted in many opportunities for employment and supported overall economic growth in the area. The feasibility of developing this area as a special economic zone is being studied by the state government.

C. Chennai Port

6. The traffic handled at Chennai has declined from 41 MTPA in 2001 to 36 MTPA in 2003, and it is expected to decline further, to 32 MTPA in 2004. This decline is attributable largely to the gradual shift of thermal coal cargo to Ennore. About 560 personnel manning the tippers for loading coal to wagons and 240 workers for coal cleaning activities at Chennai Port have been displaced due to this shift, and they have not been provided with alternative employment.

7. Residents in Chennai have benefited from the environmental improvements resulting from relocating the coal handling facilities to Ennore. CHPT's award of a build-operate-transfer contract to Chennai Container Terminal Private Limited, for the operation of the container terminal, and its plan to move iron ore operations to Ennore will further improve environmental conditions in Chennai.